For Users of Zenith Computers

SEXTANT®

Issue No. 30 September-October 1987 $3.50

A Celebration of Ten Years of Heath/Zenith Computers, *page 8*

Zenith Data Systems has been reaching new heights in 1987. This spring, the ZDS Federal Office more than tripled its area by moving into the top floor of a building in northern Virginia. Government computer contracts

helped Zenith Electronics Corp. double its first- and second-quarter sales of Computer Systems and Components. By mid-year, these computer products provided most of the entire corporation's income. *(See page 8.)*

Editing MS-DOS Command Lines—Easily, *page 46*

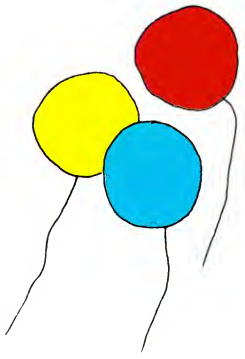
The Z100's Fifth Birthday, *page 26*

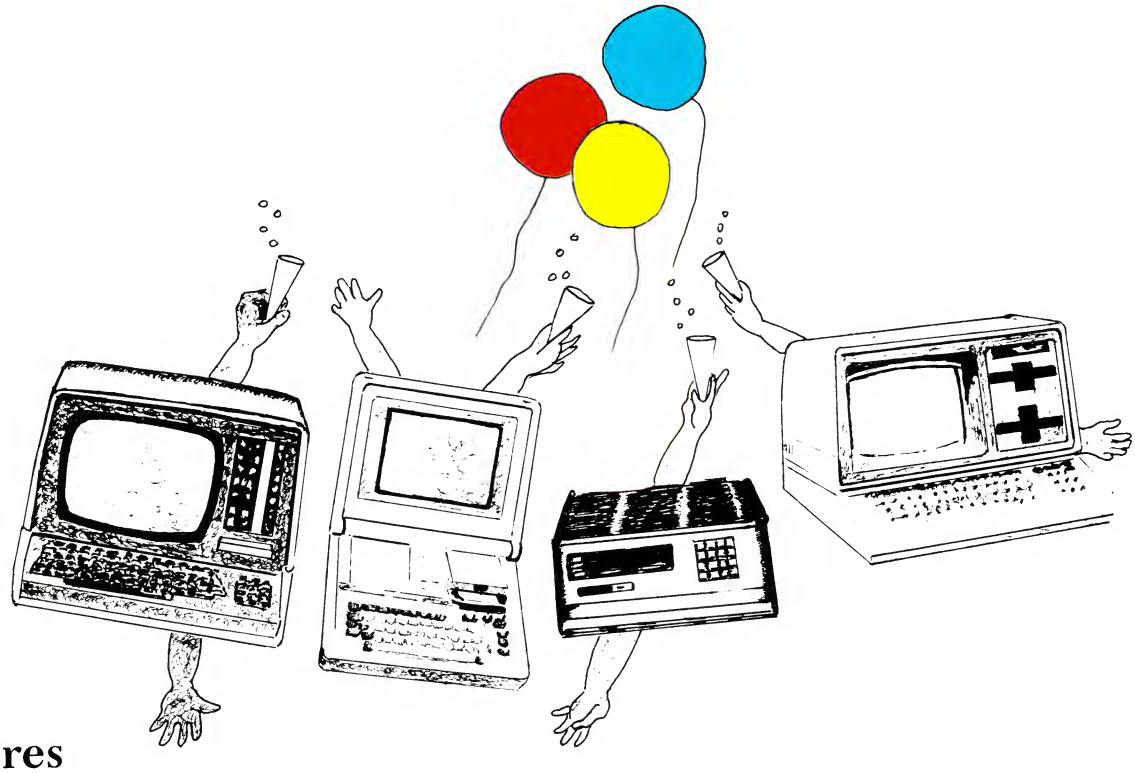
The Z248: One User's Impressions, *page 31*

Exploring Zenith's Software Update Policy, *page 22*

New Column! Perspectives on Pascal, *page 40*

SEXTANT





Features

1977: Heath Ships Its First Digital Computer
1987: Computers Capture Most of Zenith's Sales 8
Charles Floto
A product line only a decade old now dominates the income of Zenith Electronics Corporation. Zenith Data Systems celebrated the anniversary by surpassing Compaq Computer Corporation's sales.

All in the Family: Ten Years of Heath/Zenith Computers 10
Peggy Wallace
This family album provides a look at the popular—and not so popular—members of the Heath/Zenith computer clan.

The Good, the Bad, and the Uncertain 16
Peggy Wallace
Some *Sextant* readers give us their views on where Heath/Zenith stands after ten years—and where they want to go from here.

Exploring Zenith's Software Update Policy 22
Wayne Rash, Jr.
Did you ever think Zenith Data Systems had a problem keeping you supplied with current versions of all the software you're using? You probably didn't realize how many problems they *do* have with software updates.

Issue #30
September-October 1987

The Z100's Fifth Birthday: Interviews and Overviews
William N. Locke 26

The design philosophy behind the dual-processor H/Z100 series is discussed by Barry Watzman. A perspective on contemporary support is contributed by David Cheung. Also, the keeper of the "Z100 Notebook" has some notes of his own.

The Z248: One User's Impressions
Kirt Alan Winter 31

Here are some benefits of using one of Zenith's AT-compatible computers.

The Eight-Bit World
Walter J. Janowski 34

Rembrandt brings business graphs and other graphics to the H/Z89.

Perspectives on Pascal
Ben R. Ezzell 40

This new column begins with an introduction to the programming language Pascal. Some advantages of Turbo Pascal are noted. We meet the Z100 Graphics Library. And see how Turbo Pascal uses MS-DOS system calls.

Standard Operating Procedure
Editing MS-DOS Command Lines—Easily
William M. Adney 46

Did you ever want to repeat an MS-DOS command—perhaps to see the directories of several different floppy disks? Or wish you had typed an MS-DOS command *slightly* differently? The function keys can come to your aid.

C Notes
Joseph Katz 52

We consider hiding information from others while avoiding the problem of forgetting how to retrieve it ourselves.

Z100 Notebook
William N. Locke 60

Yes, there is an integrated software package for the Z100. It combines a spreadsheet, word processing, a modem-communications module, and a data base management system. It's a major software package at a minor price. We also get a look at graphics software that makes the most of the Z100's display. Would you believe a 480 x 640 pixel display?

Computer Self Defense: Getting the Upper Hand
Doris Wagner and Al Heigl 66

Getting off to the right start is important. It helps to know what some of those strange phrases are all about.

Departments

The Editorial Eye	2
Letters	4
The Eight-Bit World	34
Perspectives on Pascal	40
C Notes	52
Z100 Notebook	60
Index to Advertisers	62
Supplier Notes	73
Classified Ads	75
Scuttlebutt	76

Cover photo by Charles Floto

The Editorial Eye

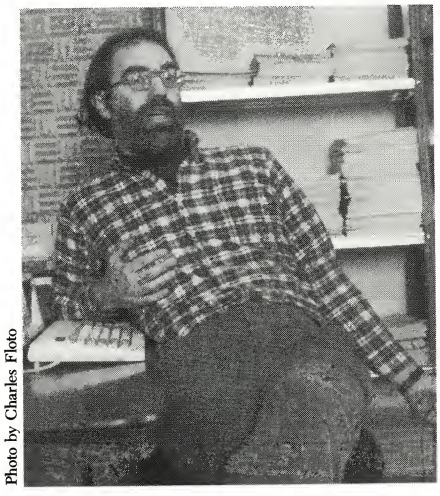


Photo by Charles Floto

They're really working me hard around here. (Or should the adverbial form be *hardly*?) After I filled up page 8 of this issue with a pithy summary of what Heath/Zenith computers have accomplished in the past decade, I still have to write two-thirds of page 2. Fortunately, there is some news left over even after I've written page 8. Some of the news relates to the other third of page 2, which reflects some changes at *Sextant*.

In May, after almost three years as circulation assistant, Gabriele Burkhard went back to being a full-time student. She still comes in on a part-time basis to help put together the pieces that make up an issue—the articles, ads, page numbers, etc. Gabriele had been circulation assistant so long that John Gill and I may have forgotten some of the details of the job when it came time to train her successor.

Our new circulation assistant is Daniel J. Duch. His previous experience with customer service was face-to-face. Danny's adjusting well to dealing with telephone calls and letters. He's been patient with John and me when one of us drops by his desk to say: *I forgot to mention, you're also supposed to. . . .*

Alice Voigt is being exposed to a variety of publishing chores as our summer assistant. She's the fourth sibling of a year-round employee to work here during the summer months. Like one of her predecessors, Alice will be returning to Allegheny College in Meadville, Pennsylvania.

If you read the fine print toward the bottom right of this page, you'll see that we've finally gotten around to raising our subscription rates. It's the first increase in six years. I wouldn't be surprised to see another one next year, when new postage rates take effect.

We also have some other changes planned. Peggy Wallace is leaving *Sextant* to return to New England. So, we'll be drawing more heavily on the editorial talents of Kieran O'Leary. He recently returned from two weeks at a publishing course conducted at Stanford University.

On page 22 of this issue, you'll find the results of Wayne Rash's investigations of Zenith's software update policy and procedures. We hope the article will help you understand just what's involved. I know many users of Zenith-distributed software have been unhappy with the software update process. I feel, however, that some customers have unreasonable expectations in this area. They're unhappy at the thought that someone, somewhere, is running software with a higher version number than what they're using. They may not ask whether the newer version has any real benefit to offer them, or how many new bugs it may incorporate. If they have version 3.33 and someone else has 3.34, they feel inadequately supplied.

My own attitude is more along the lines of: "If it ain't broke, don't fix it." Much of the software I use on a regular basis is two to four years old. I tend to be *suspicious* of new software, thinking of all the time I've spent learning how to cope with the bugs in the old software.

Charles Floto

SEXTANT®

Charles Floto
Editor
Publisher

John Gill
Assistant Publisher

Beverly Voigt
Managing Editor

John Walker
Technical Editor

Dana F. Lombardy
Advertising Manager
Special Projects Marketing Manager

Kieran O'Leary
Retail Sales Manager
Production Assistant

Peggy Wallace
Editorial Assistant

Gabriele Burkhard
Production Assistant

Daniel J. Duch
Circulation Assistant

Alice J. Voigt
Summer Assistant

Walter J. Janowski
Contributor

Joseph Katz
Contributor

William N. Locke
Contributor

Subscription Service • 202/544-0900
Advertising Inquiries • 202/544-2868
Charles Floto • 202/544-0484

Sextant (ISSN 0731-2180) is published bimonthly by Sextant Publishing Co., 716 E Street, S.E., Washington, DC 20003. Second-class postage paid at Washington, DC and at additional mailing offices. POSTMASTER: Send address changes to Sextant, 716 E Street, S.E., Washington, DC 20003.

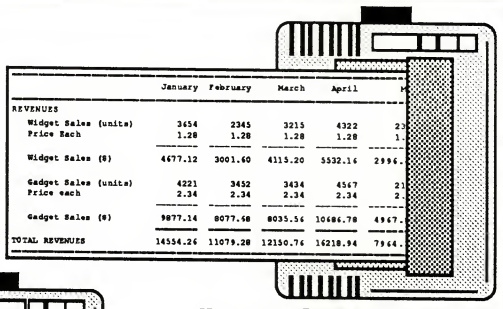
Copyright© 1987 by Sextant Publishing Co. All rights reserved. No part of this publication may be reprinted or otherwise reproduced without written permission from the publisher. Printed in the U.S.A. by Waverly Press, Inc., Easton, Maryland 21601.

Subscription rates: 6 issues (1 year) in U.S.—$17.97; in Canada and Mexico—$21.00; overseas—$25.00. Payment accepted by check in U.S. dollars payable on a U.S. bank, by U.S. and international postal money order, and by Visa and MasterCard. Please allow six to eight weeks for delivery.

"Heath" and "Heathkit" are trademarks of the Heath Company. "CP/M" is a trademark of Digital Research. "Unix" is a trademark of AT&T Bell Labs.

LONG & LOUD!

Sideways & Banner Printing Utility for Dot-Matrix Printers



	January	February	March	April	
REVENUES					
Widget Sales (units)	3654	2345	3215	4322	2
Price Each	1.28	1.28	1.28	1.28	1
Widget Sales ($)	4677.12	3001.60	4115.20	5532.16	2996.
Gadget Sales (units)	4221	3452	3434	4567	2
Price each	2.34	2.34	2.34	2.34	2
Gadget Sales ($)	9877.14	8077.68	8035.56	10686.78	4967.
TOTAL REVENUES	14554.26	11079.28	12150.76	16218.94	7964.

For *any* CP/M or MS/DOS computer (IBM compatibility is not required), just...

$34.95

***Special Offer:* one MS/DOS and one CP/M version for only...**

$49.95

We've improved our popular TWIST & SHOUT! package and given it a new name! **LONG & LOUD! Version 2.0** is easier to use and install, includes new typefaces in both LONG (four sizes) and LOUD (Times, Sans Serif, Olde English, Script and Symbols — in both upper and lower case). **LONG** lets you print out your spreadsheets (or any file) the long way (sideways) on your dot-matrix printer. No more cutting and pasting to put together a fragmented printout. **LOUD** prints giant banners in letters from two to eight inches high. Make banners & posters with ease!

PRESTO!™

Multi-Function Software Supercharger for CP/M

NEW for Heath/Zenith

Profiles magazine wrote, *"PRESTO still has the edge over Write Hand Man in features and general polish..."* And now we've improved it even more! PRESTO adds features to any program you run. Just hit a special trigger key and PRESTO suspends your current program and opens a window on-screen. You can then call up a floating point calculator, a programmers calculator (hex, binary, octal, decimal), a notepad, a perpetual calendar, a Rolodex™, and perform screen dumps. Hit another key and you're right back where you left your original program.

PRESTO! (Version 3) uses almost 5K less memory than previous versions, yet includes great new features like:

NEW CP/M Commands: From within any program you can now do a directory, copy and rename files, erase files, and type files to the screen.

NEW Keyboard Macro Processor: Throw away SmartKey and XtraKey because PRESTO now includes its own key processor. The keys module includes powerful features like the ability to automatically load special key definitions for each program you use. One key can do the work of hundreds — a real time saver!

And best of all — the price is just **$39.95**. Available for all Heath/Zenith CP/M computers using H19/89 type terminal. Versions are also available for Morrow, Osborne, Kaypro and Otrona. Specify computer and hard or soft sector format.

Rembrandt

Complete Business Graphics Toolkit™

Finally there's an easy and fun way to create graphics on your H/Z-89, H/Z-90, H/Z-100 *(CP/M only)* computer or any H/Z-19 equipped machine.

No extra hardware required! It works with a standard unmodified machine yet also supports the TMSI SuperSet ROM, and the Font19 Character ROM.

Freehand drawing: You can easily draw lines, boxes, circles and write on the screen in large characters. Full block operations are also supported — move, delete, fill, copy and more! Your graphic creations can be saved to disk and recalled at any time for further editing. Layout forms, design logos, draw diagrams and pictures. It's easy and fun to use.

Business graphics: REMBRANDT lets you create horizontal and vertical bar charts, pie charts and xy plots (scatter graphs). Use hand-entered data or read numerical data from virtually any source including dBase II, SuperCalc, MBasic, Wordstar and ASCII files.

Slide shows: Sequence your graphics on-screen using eleven cinematic special effects like wipes, fades and spirals. Produce electronic 'slide shows' without any programming.

Print your graphics: Print your graphic screens on most dot-matrix and daisy wheel printers. Interface with all word processors so that your reports can include charts, graphs or any graphic creation — intermixed with your text!

Compatible: It even reads, displays and prints *Ed-A-Sketch* files!

Affordable: Even with all of this power, REMBRANDT is available for an amazingly low price of... ***$39.95***

REMBRANDT runs on H/Z-89's, 90's, 100's and H/Z-19 equipped machines.

Other Stuff: **MILESTONE** Business Project Planner (CP/M and MS/DOS) $99.95, **MEDIA MASTER** Disk Conversion (Z-100, PC-DOS) $39.95, **MEDIA MASTER PLUS** Disk Conversion & CP/M Emulator $59.95, **ACCELERATE 8/16** including V20 chip $99.95

T E C H N O L O G I E S, I N C.

22458 Ventura Blvd., Suite E
Woodland Hills, CA 91364

We accept **VISA**, **MASTERCARD** and **AMERICAN EXPRESS**

Order by mail or call our 24 hour toll free order line from anywhere in the US or Canada:

800-628-2828 (Extension 918)

Technical questions, orders: 818-716-1655 (9-5 PST)

Add $4 per order postage/handling. Overseas, add $12. US funds only. CA residents add 6% tax (LA County 6.5%)

Circle #198 on Reader Service Card

Letters

Illegal interrupts

The article "Taming the Wild Interrupt" by Robert S. Logan in your July-August issue [*Sextant* #29] deserves a few compliments. It was well written, brief, and to the point. Not only did Mr. Logan home in on a problem that plagues Z100 buffs from time to time, but he provided a simple and elegant utility to help cope with it.

The source code listing (and accompanying description) was easy to understand and works as advertised. I appreciate the fact that his listing is short, and devoid of the usual fanciness that can confuse the issue.

One of the main purposes of his program (TAME.COM) is to help track down illegal software interrupts. With this in mind, it would seem a natural enhancement for the program to provide the interrupt number which caused the problem, instead of merely the CS:IP where the wild interrupt occurred. This can be done quite simply by adding the code [in Listing A].

Paul F. Herman
New Port Richey, FL

Support for support

I'd like *Sextant* readers to know about the excellent support provided by one of your advertisers—Hogware Company (470 Belleview Ave., Webster Groves, MO 63119, 314/962-7833).

I was recently preparing an elaborate presentation using the Hogware ShowOff package when, only a day and a half before the presentation, I discovered that the number of graphic images to be shown exceeded the capacity of the automatic display module. Within an hour or so, Janet and Rich Hirsch called back to say they had patched the program to allow it to handle a larger number of "slides." They then patiently worked with me to overcome modem communications compatibility problems until we successfully transferred the patched version to my computer.

Thanks to their prompt and effective support, the presentation, with its high-resolution interlaced graphics display, was a great success.

Norman Smith
Corning, NY

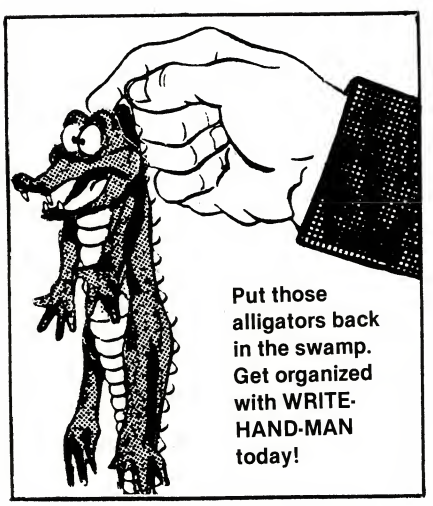
Memory problems

I think that there is a problem with John J. Batbie, Jr.'s article on the Z100 RAM-disks which appeared in your May-June 1987 issue ["Standard Operating Procedure: Assemble a New Memory Disk for Your '100," *Sextant* #28].

I realize that he is running MS-DOS 2.x with a Z100, and that MS-DOS 3.1 changed MDISK to VDISK, and that it went from a DVD file to an assembly file. But he seems to think that just because he has populated his RAM board with three sticks of 256K chips, he now has a "760-kilobyte Z100 . . ."

As my friends explain it to me, unless you implement an extended-memory hardware device that goes beyond the basic working memory board that comes with the typical 8088-based computer, all that the CPU chip can access under MS-DOS (at least through release 3.1) is a maximum of 640K of on-board RAM. (I have three sticks of chips in my Z158, total 768K, but when I do the memory check—Control/Alt/Insert—all that the system recognizes is 640K.) The IBM-PC RAM-disk product, Hyper-Drive, doesn't seem to work on a Z15X to retrieve any of that more than 640K RAM because its installation requires resetting two DIP-switch banks that don't appear on the Z15X boards. My uninformed guess is that Batbie's modification of MDISK to make it look like 3.1's VDISK merely partitions the addressable 640K and does nothing about the extra 128K of unaddressable core in that third row of chips.

Maybe you might want to have your MS-DOS guru check to see if any of the procedures in his article have any effect on that 128K beyond 640K. It sure didn't



Circle #173 on Reader Service Card

```
...Existing code near the end of the SNAP PROC...

        LEA     SI, REGCRLF             ; finish with a crlf
        CALL    OUTS
;
...Insert these new lines...

        PUSH    DI
        MOV     DI, ES:[BX]
        MOV     ES, ES:[BX+2]           ; es:di is now user's CS:IP
        CMP     BYTE PTR ES:[DI-2], 0CDH ; was bad instruction a software int?
        JE      SNAP2
        LEA     SI, UNKNOWN             ;  no, source is unknown
        CALL    OUTS                    ;    so print message
        JMP     SNAP3
SNAP2:  LEA     SI, INTMESS             ; yes, display int number
        CALL    OUTS
        MOV     AL, ES:[DI-1]
        MOV     AH, 0
        CALL    OUTW
SNAP3:  LEA     SI, REGCRLF
        CALL    OUTS                    ; do crlf
        POP     DI

...Now back to the original code...

;
        POP     BP
        POP     SI
        POP     BX
        RET
SNAP    ENDP
;
...Insert two more lines at this point...

UNKNOWN DB      'Unknown Origin...',0
INTMESS DB      'Software interrupt ',0

...And then the rest of the original code...
```

Listing A. See "Illegal interrupts," above left.

happen during the evening I spent with VDISK on my '158.

Joe Pascudniak
Pensacola, FL

Limitations on memory expansion were discussed by Richard L. Mueller in Sextant *#23, July-August 1986. See "From FBE: 1216K RAM for Your '151." As he noted, the 640K limit is a product of IBM's use of the address space in its Personal Computer. The Z100 is not subject to the limitations of IBM compatibility.*

WIN89 update from Micronics

I would like to provide an update to Mr. Janowski's article on the WIN89 hard disk for the H89 ["The Eight-Bit World," *Sextant* #29, July-August 1987]. His criticism of the controller mounting in the H89 vs. the H89A has been corrected. The controller card is now solidly mounted to the hard-disk drive. The necessary parts were sent free of charge to WIN89 customers. The WIN89 manual was recently updated to include customer comments to improve clarity. Support for H89s using Magnolia and C.D.R. controllers will be available at HUGCON 87. HDOS will be supported in the near future.

Darrell C. Pelan
Micronics Technology
449 Barbados Way
Niceville, FL 32578

No news isn't good news

As a subscriber to *Sextant* since issue #1, I am wondering why you haven't published any technical discussions of the H/Z248.

I am still using the H89 I assembled in 1981, and in fact am writing this on it.

However, when it malfunctioned late last year, I tried to buy a Z100 at Heath's close-out sale, as a backup unit. After I was told that the supply was totally sold out, I changed my order to the H248 with the idea of going first class. I have long since repaired the H89, and it took Heath six months to ship my '248.

Now that I finally have it, I have been looking in vain for any articles concerning usage, modifications, etc., in *Sextant*, *Buss*, or *REMark*. There have been a few brief paragraphs in *H-Scoop*, mostly regarding problems with the math co-processor (which I don't expect to need).

Surely there are others who are no longer interested in making changes to the H89 and who do not own a Z100. I have seen brief mentions of the use of the '248 in *Byte* and some other magazines, by apparently well satisfied users, but nothing of a technical nature since the overheating problems with the early '248 model.

J. D. Miner
Lima, OH

As your own wait for the H248 suggests, the '248 has been slow in reaching the commercial marketplace. We certainly welcome articles on the '248. In fact, there's one on page 31 of this issue.

Currently, the primary advantage of computers based on the 80286 processor is speed. There's little software or hardware that can be used only with an H/Z248. Our articles on MS-DOS and the '150-series machines are applicable to your H248.

Getting the time of day

Mr. Giambra's "Put a Clock Face on Your '100" in your May-June 1987 issue [*Sextant* #28] uses the DATE function (line 490) in Z-BASIC in computing the "day of the week."

The DATE function is not recognized in GW-BASIC. I have changed lines 490-END of his program so that the "day of the week" can be computed while using GW-BASIC. This algorithm will work for any date between January 1st, 1900, and January 1st, 2000.

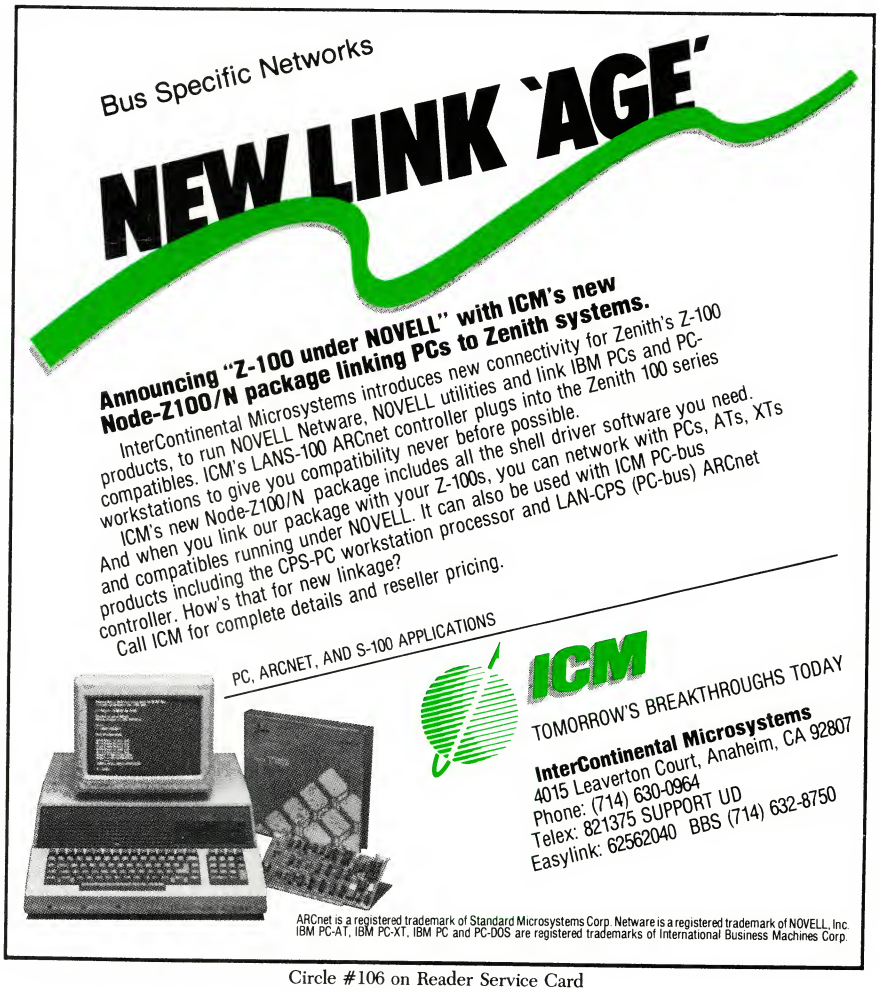
The revised program lines are [in Listing B].

Note: Change the GOTO line numbers in lines 10-30 to match the new line numbers.

Jim Woodruff
Milwaukie, OR

```
490 MONTH=VAL(MID$(DATE$,1,2))
500 DAY=VAL(MID$(DATE$,4,2))
510 YEAR=VAL(MID$(DATE$,7,4))
520 IF MONTH<3 GOTO 550
530 MT=INT((MONTH+1)*30.6)
540 YT=INT(YEAR*365.25):GOTO 570
550 MT=INT((MONTH+13)*30.6)
560 YT=INT((YEAR-1)*365.25)
570 DT=(MT+YT+DAY-621049!)/7
580 DT=CINT((DT-FIX(DT))*7)
590 ON DT GOTO 610,620,630,640,650,660
600 DY$="sunday   ":RETURN
610 DY$="monday   ":RETURN
620 DY$="tuesday  ":RETURN
630 DY$="wednesday":RETURN
640 DY$="thursday ":RETURN
650 DY$="friday   ":RETURN
660 DY$="saturday ":RETURN
670 RESUME 20
680 CLS:PRINT"Date not set -- Aborting":SYSTEM
```

Listing B. See "Getting the time of day," above.


Bus Specific Networks
NEW LINK 'AGE'
Announcing "Z-100 under NOVELL" with ICM's new Node-Z100/N package linking PCs to Zenith systems.
InterContinental Microsystems introduces new connectivity for Zenith's Z-100 products, to run NOVELL Netware, NOVELL utilities and link IBM PCs and PC-compatibles. ICM's LANS-100 ARCnet controller plugs into the Zenith 100 series workstations to give you compatibility never before possible.
ICM's new Node-Z100/N package includes all the shell driver software you need. And when you link our package with your Z-100s, you can network with PCs, ATs, XTs and compatibles running under NOVELL. It can also be used with ICM PC-bus products including the CPS-PC workstation processor and LAN-CPS (PC-bus) ARCnet controller. How's that for new linkage?
Call ICM for complete details and reseller pricing.
PC, ARCNET, AND S-100 APPLICATIONS
ICM
TOMORROW'S BREAKTHROUGHS TODAY
InterContinental Microsystems
4015 Leaverton Court, Anaheim, CA 92807
Phone: (714) 630-0964
Telex: 821375 SUPPORT UD
Easylink: 62562040 BBS (714) 632-8750
ARCnet is a registered trademark of Standard Microsystems Corp. Netware is a registered trademark of NOVELL, Inc.
IBM PC-AT, IBM PC-XT, IBM PC and PC-DOS are registered trademarks of International Business Machines Corp.

Circle #106 on Reader Service Card

CABLES

RAM Technology carries a complete selection of quality cables in stock. The following is just an example of our product line. All cables come with a One Year Warranty. Special orders accepted; call us Toll Free for a quotation on your cable requirements.

Quantity Pricing Available On Request

CPP-6: 6 Ft. Molded Parallel Printer ..... $ 18.50
CSMF-182-9: 9 Ft. Molded Serial DB25M-DB25F, Pins 1-8/20 ..... $ 15.50
CSMF-125-9: 9 Ft. Molded Serial, DB25M-DB25F, Pins 1-25 ..... $ 18.50
CSAT-925-2: 2 Ft. Molded AT Serial Adaptor, DB9M-DB25F ..... $ 12.95
CPCE-6-KEY: 6 Ft. Molded Keyboard Extension Cable .... $ 9.50
CPCE-6-MON: 6 Ft. Molded RGB/TTL Monitor Extension Cable ..... $ 14.50

Need a cable for your APPLE or MACINTOSH?
Call us for pricing and availability!

DISKETTES

RAM Technology carries a full line of quality diskettes by NASHUA, SONY, MAXELL, 3M and other major manufacturers. Call us toll free for pricing on your diskette needs.

Quantity Pricing Available On Request.

NMD2D: Nashua DS/DD, 48 TPI Soft Sector, 5¼", Box of 10 ..... $ 8.95
NMD210D: Nashua DS/DD, 48 TPI Hard Sector, 5¼", Box of 10 ..... $ 9.95
NMD2F: Nashua DS/DD, 96 TPI Soft Sector, 5¼", Box of 10 ..... $ 4.95
NMD210F: Nashua DS/DD, 96 TPI Hard Sector, 5¼", Box of 10 ..... $ 15.95
NMD2HD: Nashua DS/HD, High Density (AT), 5¼", Box of 10 ..... $ 21.95
NMF2: Nashua DS/DD, 135 TPI, 3½", Box of 10 ..... $ 20.95
NFD2D: Nashua DS/DD, Soft Sector, 8", Box of 10 ..... $ 20.95
GENERIC: DS/DD, 48 TPI Soft Sector, 5¼", Box of 10 ..... $ 6.95
BULKPC: DS/DD, 48 TPI Soft Sector, 5¼", Box of 50 ..... $ 25.00
BULKAT: DS/HD, High Density (AT), 5¼", Box of 50 ..... $ 60.00

U.S. ROBOTICS MODEMS

U.S. Robotics makes a complete line of high quality modems at reasonable prices. We use them and we recommend them above all others for their quality, utility and value.

USR-1200-C: Courier 1200 External ..... $ 235.00
USR-1200-M: Microlink 1200 Baud Internal with Telpac Software ..... $ 219.00
USR-1200-P: Password 1200 Baud External ..... $ 219.00
USR-1200-S: Sportster 1200 Baud External ..... $ 129.00
USR-1200-V: Varmodem 1200 Baud Internal ..... $ 119.00
USR-2400-CE: Courier 2400E Baud External ..... $ 475.00
USR-2400-M: Microline 2400 Baud Internal with Telpac Software ..... $ 435.00
USR-2400-V: Varmodem 2400 Baud Internal ..... $ 205.00
USR-9600-C: Courier HST 9600 Baud External ..... $ 785.00

HARD DISK DRIVES & CONTROLLERS

All Hard Disk Drives come with Installation Instructions and a One Year Replacement Warranty. System Orders (hard disk & controller) come with Cables and Hardware. All controllers capable of handling two drives unless otherwise specified.

PC COMPATIBLE HARD DISK SYSTEMS

ST-225PC: 20 MB. Hard Disk with Controller* ..... $ 349.00
ST238RC: 30 MB. Hard Disk with RLL Controller* ..... $ 425.00
ST-251PC: 40 MB. Hard Disk with Controller* ..... $ 569.00
ST-251RC: 44 MB. Hard Disk with RLL Controller* ..... $ 545.00
ST-277RC: 65 MB. Hard Disk with RLL Controller* ..... $ 610.00

* Your Choice of Seagate, OMTI, or Western Digital Controller.

AT COMPATIBLE HARD DISK SYSTEMS

ST-225AT: 20 MB., 65 ms., Half Height ..... $ 299.00
ST-251AT: 40 MB., 40 m., Half Height ..... $ 499.00
ST-251RT: 44 MB. Hard Disk with AT RLL Floppy/HD Controller ..... $ 699.00
ST-277RT: 65 MB. Hard Disk with AT RLL Floppy/HD Controller ..... $ 769.00
ST-4038: 30 MB., 40 ms., Full Height ..... $ 605.00
ST-4053: 45 MB., 28 ms., Full Height ..... $ 715.00
ST-4096: 80 MB., 28 ms., Full Height ..... $ 995.00
MS-3650: 30 MB., 28 ms., Half Height ..... $ 480.00
MS-6085: 80MB., 28 ms., Full Height ..... $ 990.00

RAM TECHNOLOGY HARD CARDS

OLHC-20: 20 MB. Hard Card featuring AUTO-START and AUTO-PARK heads, 65 ms. ..... $ 425.00
OLHC-30: 30 MB. Hard Card featuring AUTO-START and AUTO-PARK heads. 65 ms. ..... $ 475.00

CHUGCON SPECIAL

$10.00 OFF

Any PC or AT Compatible Hard Disk Drive
Offer Expires November 1, 1987

FLOPPY DISK DRIVES

All Disk Drives come with Installation Instructions, Hardware and One Year Replacement Warranty.

MF501A: Mitsubishi 360K, 5¼" Half Height, 48 TPI ..... $ 115.00
MF504A: Mitsubishi 1.2 MB., 5¼" Half Height, 96 TPI ..... $ 149.00
PAN-360: Panasonic 360K, 5¼" Half Height, 48 TPI ..... $ 99.00
PAN-120: Panasonic 1.2 MB., 5¼" Half Height, 96 TPI ..... $ 135.00
PAN-720: Panasonic 720K, 3½" ..... $ 110.00

MULTI-PORT SERIAL BOARDS

For applications requiring multiple serial ports, i.e., Xenix, Unix, BBS, etc. All boards include necessary hardware. Order Drivers Separately One Year Warranty.

DBCOM4S: Four Serial Ports. Compatible with systems up to 16 MHz ..... $ 409.00
DBCOM8S: Eight Serial Ports. Compatible with systems up to 16 MHz ..... $ 640.00
DBCOM4I: Four Serial Port Intelligent Controller, 80186 Processor, On Board Buffering. Compatible with systems up to 16 MHz ..... $ 825.00
DBCOM8I: Eight Serial Port Intelligent Controller, 80186 Processor, On Board Buffering. Compatible with systems up to 16 MHz .... $ 995.00
DBMSDOS: MS-DOS Device Driver ..... $ 25.00
DBMDV22: Microport V/286 2.2 Device Driver ..... $ 35.00
DBSDV22: SCO Xenix V/286 2.2 Device Driver ..... $ 35.00

SOFTWARE

RAM Technology carries a complete line of software for your computer system. Call us Toll Free for pricing and availability on your software requirements.

Microport Unix V/286 Version 2.2
Run-Time System (2 User License) ..... $ 180.00
Software Development System ..... $ 225.00
Text Preparation System ..... $ 180.00
Complete System ..... $ 495.00
DosMerge 286 ..... $ 135.00
Unlimited User License ..... $ 225.00

SCO Xenix V/286 Version 2.2
Operating System (14 User License) ..... $ 465.00
Software Development System ..... $ 445.00
Text Preparation System ..... $ 155.00
Complete Xenix System ..... $ 970.00

FIFTH GENERATION'S FASTBACK ..... $ 125.00
HILGRAEVE HYPERACCESS (Z-100 or PC version) .... $ 119.00
ONTRACK Disk Manager ..... $ 55.00
ONTRACK Disk Manager Diagnostics ..... $ 55.00

CHUGCON SPECIAL

FREE SHIPPING

Anywhere In The Continental U.S.A.
Offer Expires November 1, 1987

TERMS

Prices and specifications subject to change without notice. Personal checks held 10 working days; money orders accepted as cash. Please add 2% (minimum $2.50) for shipping. COD orders accepted; cash or cashier's check only. VISA/MC accepted. Purchase orders accepted from qualified businesses, government agencies, and educational institutions.

RAM TECHNOLOGY

All RAM Technology products include Hardware, Installation Instructions, and One Year Warranty. No soldering is required.

Z-100 1.2 MB External Floppy System; Utilize your Z-100's built-in 8" controller for high capacity storage and back-up. System includes drive(s), cables, external power supply and cabinet.

DRSZ112-1: One 5¼" 1.2 MB High Density Floppy Disk Drive system ..... $ 249.00

DRSZ112-2: Two 5¼" 1.2 MB High Density Floppy Disk Drive system ..... $ 439.00

Z-MAX 100: 768K Memory Upgrade for new motherboard Z-100's; #181-4918 or greater; simple plug-in installation ..... $ 59.95

Z-MAX 148: 704K Memory Upgrade for the H/Z 148 computer ..... $ 19.95

Z-MAX 150: 640/704K Memory Upgrade for H/Z 150/160 series computer. Installs on your existing memory board. ..... $ 24.95

Z-MEG 150: 1.2 MB. Memory Upgrade for H/Z 150/160 series computer. Up to 704K of addressable memory and 512K RAM DISK can be installed on your existing memory board. Please specify 640K EGA compatible or 704K Version when ordering. RAM-DSK software included ..... $ 49.95

Z-MEG 171: 1 MB. Memory Upgrade for the ZFL-171. Up to 640K of addressable memory and a 360K RAM DISK can be installed on your existing memory board. Software included. Developed jointly by FBE Research and RAM Technology ..... $ 89.95

Z-181 External 5¼" Disk Drive; 360K DS/DD 48 TPI Disk Drive mounted in half height enclosure. Interface Cable included.

DRSZ181-1: For the ZFL-181-92 ..... $ 225.00

DRSZ181-2: For the ZFL-181-93 and ZWL-183-92 ..... $ 245.00

Z-181 External Hard Disk Drive: 20 MB. Hard Disk Drive for the ZFL-181-93 mounted in half height, fan cooled enclosure. Interface Cable included. ..... Call

3½" Disk Drive Upgrade: For PC's and Compatibles including all Z-100 PC and Z-200 PC series computers. Maintain compatibility with the new PS/2 and Portable software formats and increase storage capacity to 720K per diskette utilizing your existing floppy disk controller. Includes mounting hardware for 5¼" enclosures. Requires MS-DOS 3.2 or greater ..... $ 169.00

AT COMPATIBLE MEMORY UPGRADES

All Memory Expansion Cards come with Hardware, Installation Instructions, LIM/EMS Software, and a One Year Warranty. Fully populated boards available from 2 MB. to 16 MB., for systems up to 1 MHz.

2 MB. Memory Expansion Board: Fully populated with 256K DRAM, expandable to 4 MB. with optional 2 MB. Daughter Board.

MICN2MB-8: Compatible with systems up to 8 MHz ..... $ 650.00

MICN2MB-12: Compatible with systems up to 12 MHz ... $ 725.00

MICN2MB-D: 2 MB. Daughter Board ..... $ 50.00

4 MB. Memory Expansion Board: Fully populated with 256K DRAM. Requires one slot only!

MICN4MB-8: Compatible with systems up to 8 MHz ..... $ 725.00

MICN4MB-12: Compatible with systems up to 12 MHz ... $ 799.00

PC COMPATIBLE UPGRADE ACCESSORIES

Just because you don't see it doesn't mean we don't carry it. Call Toll Free for pricing and availability on the accessory of your dreams!

AST RAMPAGE: EMS/EEMS. Expandable up to 2 MB. 64K Memory Installed ..... $ 269.00

AST ADVANTAGE: EMS/EEMS, expandable to 1.5 MB. One Serial and One Parallel Port. 128 K Installed. $399.00

FBE RESEARCH SMARTWATCH: No Slot Clock/Calendar, 10-year lithium battery. Easy plug-in installation. Includes installation instructions, and software with source code. 120 Day Warranty ..... $ 44.00

MICROSPEED FAST 88: Speed upgrade for PC's and Compatibles. Guaranteed to work in your H/Z 150/160 or PC, PC/XT series computer or your money back! Increases CPU speed up to 7.6 MHz. Speed is switchable via software or external speed switch module. Includes Installation Manual, software, and hard ware. One Year Warranty.

FAST88-1: No Processor included ..... $ 125.00

FAST88-2: With Optional 8088-2 8 MHz. Processor ..... $ 130.00

FAST88-3: With Optional NEC V20 8 MHz. Processor ..... $ 135.00

CHUGCON SPECIAL
NO SURCHARGES

No MasterCard or Visa Surcharges On All Orders Placed During September and October!

SPECIAL ORDERS
We LOVE a CHALLENGE!

If you have a special need, or if you want a specific hardware or software product, Call us Toll Free for a quotation!

Z-100 UPGRADE ACCESSORIES

RAM Technology carries a complete selection of upgrades and accessories for your Z-100 computer. Call Toll Free for pricing and availability.

C.D.R. ZS-100: Speed Upgrade for 4.7 MHz. Z-100's. Easily installed, no soldering required ..... $ 44.95

FBE RESEARCH ZMF-100A: 768K Memory Upgrade for Z-100's with old motherboards; #181-4917 or lower; no soldering required ..... $ 59.95

UCI EASYRAM: Memory Expansion Board for Z-100 S-100 Buss. Expands memory up to 2 MB. using 256K DRAM. For systems with 192-768K main memory.

UCI-ER-0: 0 Kb. RAM ..... $ 299.00

UCI-ER-1: 1 MB. RAM ..... $ 415.00

UCI-ER-2: 2 MB. RAM ..... $ 575.00

UCI-ER-S: RAMDRIVE Software ..... $ 43.00

UCI EASY 87: Math Co-Processor Board for Z-100 ..... $ 85.00

Z-100 Hard Disk Drive Sub-Systems

Includes Installation Instructions, Hard Disk Controller, Cables, Hardware, Software and One Year Warranty

20MB. Internal Hard Disk Drive System with CDR Controller ..... $ 750.00

w/UCI EASYWIN Controller ..... $ 650.00

40 MB. Internal Hard Disk Drive System with CDR Controller ..... $ 950.00

w/UCI EASYWIN Controller ..... $ 850.00

65 MB. Internal Hard Disk Drive System with CDR Controller $1100.00

w/UCI EASYWIN Controller ..... $ 999.00

Z-100 Hard Disk Drive Controllers

CDR 317 Controller Kit: Interface and Controller ..... $ 575.00

CDR317-IIB SCSI Interface Only ..... $ 335.00

UCI EASYWIN Interface and Controller ..... $ 399.00

UCI EASYWIN Interface Only ..... $ 265.00

NEW PRICES!
NEW PRODUCTS!
SERVICE & SUPPORT!

DYNAMIC RAM MEMORY

Includes Installation Instructions. One Year Warranty. Prices current 8/1/87 and subject to change; call Toll Free for current prices.

Quantity Pricing Available On Request.

4164-150 : 64K 150 ns. DRAM ..... $ 1.40

41256-150: 256K 150 ns. DRAM ..... $ 3.28

41256-150: 256K 120 ns. DRAM ..... $ 3.55

41256-100: 256K 100 ns. DRAM ..... $ 4.40

PROCESSORS

Intel processors include Installation Instructions, and a Five Year Warranty. Prices current 8/1/87 and subject to change; Call Toll Free for current pricing.

Quantity Prices Available On Request.

8088-2 : 8 MHz. Processor ..... $ 8.95

8087-3 : 5 MHz. Math Co-Processor ..... $ 119.00

8087-2 : 8 MHz. Math Co-Processor ..... $ 169.00

8087-1 : 10 MHz. Math Co-Processor ..... $ 225.00

80287-6 : 6 MHz. Math Co-Processor ..... $ 195.00

80287-8 : 8 MHz. Math Co-Processor ..... $ 269.00

80287-10: 10 MHz. Math Co-Processor ..... $ 325.00

80387-16: 16 MHz. Math Co-Processor ..... $ 595.00

NEC V20: 8 MHz. 8088 replacement microprocessor. Increases CPU efficiency 10-30%. Includes Installation Instructions. One Year Warranty ..... $ 12.95

RAM Technology

427-3 AMHERST STREET, SUITE 265
NASHUA, NEW HAMPSHIRE 03063

1 800 662-0070 • 603 889-0633

HOURS OF OPERATION: Monday-Friday, 9:00 A.M. - 5:00 p.m. EST

MasterCard

VISA

Circle #129 on Reader Service Card

1977: Heath Ships Its First Digital Computer

1987: Computers Capture Most of Zenith's Sales

Charles Floto

Zenith Electronics Corporation now derives the majority of its gross income from the sale of computers and related products. Specifically, second-quarter sales in Zenith's Computer Systems and Components category were $291 million—or 54% of the company's $538 million total sales for the quarter closing in early July.

That represents an increase of 105% over 1986's second-quarter sales in the computer area. At that time, Computer Systems and Components contributed 37% of corporate gross income.

By the first quarter of this year, computers and related products were producing 49.7% of Zenith's corporate income, or $272 million. In comparison, Compaq Computer Corporation reported first-quarter sales of $210 million. Compaq managed to retain its advantage over Zenith in the public eye—in part because Compaq has concentrated on sales through retailers, while Zenith has emphasized signing large contracts with educational institutions, state and federal government units, and other computer vendors.

Compaq's strategy involves more advertising and a greater emphasis on public relations. Part of Compaq's message has been along the lines of: *You know we're wonderful, because we're growing so fast.* But *now* Zenith's computer sales are growing faster than Compaq's—at times, twice as fast. (Between the first quarter of 1986 and the first quarter of 1987, Zenith's sales of Computer Systems and Components increased by 108%, while Compaq's sales grew 47%.)

Ten years ago, in early September of 1977, Heath Company customers started receiving the first Heathkit digital computer—the H8. That was two years before Heath was purchased by what was then known as Zenith Radio Corporation. Within eight years of Zenith's purchase of Heath, digital computers have taken over Zenith.

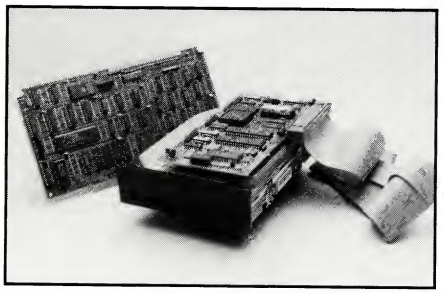
The "Radio" portion of the corporate name survived the dominance of television—which does depend on radio waves, after all. But getting into the computer business called for a change—if only to penetrate the consciousness of the investment community.

With the 1984 name change to *Zenith Electronics Corp.*, *Business Week* began to list Zenith in its tables for the "Electrical and Electronics" industry, rather than under "Appliances." Zenith left the company of Maytag and Whirlpool to join Intel and Texas Instruments. A rose by any other name may smell as sweet, but a stock doesn't.

Ten years of Heath/Zenith computers. Computer Systems and Components making up over half of Zenith revenues. Either milestone by itself would be reason enough for a brief look around us. We'll start with a summary of the computers produced in those ten years. Then we'll sample some views of the issues facing us today. We'll focus in particular on an issue affecting every Heath/Zenith user—Zenith's software update policies and practices.

NEW PRODUCT ANNOUNCEMENT

UCI Mini Catalog:



EasyWIN

Most economical hard disk system available for the Z-100. It replaces the Z-217 hard disk system and works just like it. You can prep it, part it, and boot from it.

Features:

▪ Direct replacement of Zenith Z-217 Winchester disk. ▪ Controls 2 physical drives. ▪ Supports auto boot, all Z-100 formats, and Zenith diagnostics. ▪ Operates in any Z-100 with or without EasyPC. ▪ Future support of other hard disk controllers, removable cartridge drives, etc. ▪ Operates at 5 or 8 MHz.

Includes:

▪ Intelligent controller card to adapt IBM PC compatible hard disk controller to the Z-100. ▪ Western Digital PC hard disk controller card. ▪ Seagate 10/20/30 MB hard disk drive (ST215/225/238). ▪ Drive cables. ▪ Fully documented User's Manual.

Z-148 Expansion Chassis

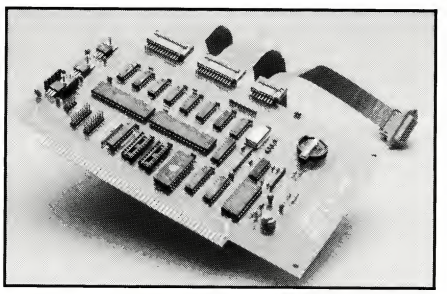
Finally a way for Z-148 users to take advantage of the growing world of IBM PC hardware including EGA, PGA, modems, hard disk drives, multifunction cards, etc.

Features:

▪ 8 available slots: 6 full PC slots and 2 half-size slots. ▪ 135 watt switching power supply with built-in fan. ▪ UL and FCC approved chassis and power supply. ▪ 5 or 8 MHz no wait state. ▪ Standard internal mounting brackets for 2 full-height or 4 half-height drives. ▪ Easy access, flip top metal case.

Includes:

▪ Z-148 adapter. ▪ 5 ft. shielded cable. ▪ Fully documented Installation Manual. ▪ Dimensions: 17.5″ D × 19.5″ W × 5.5″ H. ▪ Weight: 25 lbs. ▪ Color: Ivory.



I/O Plus

The least expensive way to obtain respectable but limited PC compatibility in a Z-100. Will run many, but not all, popular PC programs. Some copy protected programs may present problems unless patched.

Features:

▪ ZPC™ program and hardware circuit. ▪ ZPC program on EPROM (optional). ▪ One game port (2 joy sticks). ▪ Up to 115k baud rate. ▪ 2 IBM 8250 serial ports. ▪ Clock calendar with battery back-up. ▪ Fully documented User's Manual.

ZPC is a trademark of Heath Users Group. IBM & IBM PC are trademarks of IBM Corporation. Z-100, Z-148 & Z-217 are trademarks of Zenith Data Systems.

Call now for your copy of the Fall '86 Edition of the UCI Product Catalog.

800-UCI-COMPUTER

UCI CORPORATION

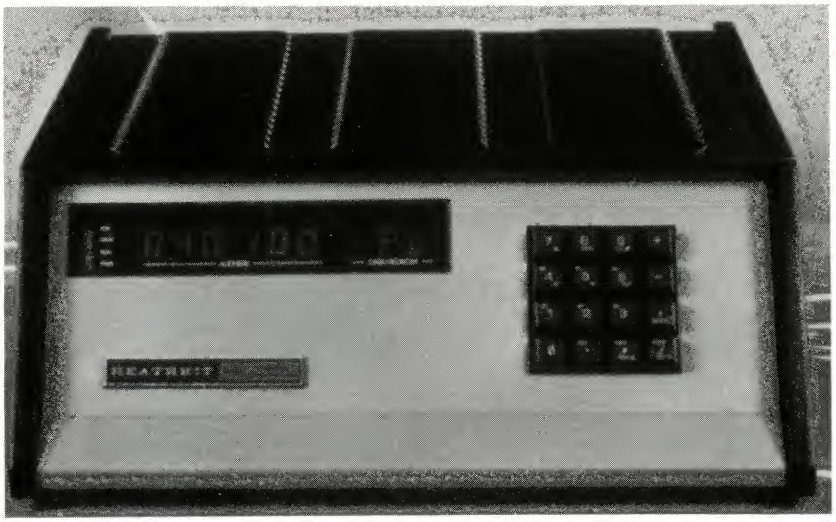
948 Cherry Street, Kent, Ohio 44240
(216) 673-5155 / 800-UCI-COMPUTER

Circle #196 on Reader Service Card

All in the Family: Ten Years of Heath/Zenith Computers

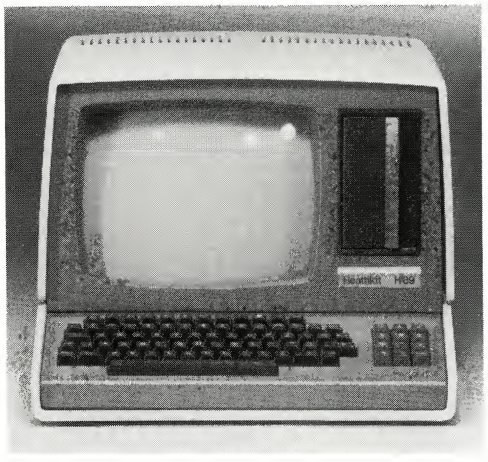
Read this one aloud to your computers so they can get to know their relatives.

Peggy Wallace



Compared with today's computers, the **H8** looks like a deli scale. But this machine—designed around an 8080 CPU—launched the age of Heath computing ten years ago, and still commands a devoted (even fanatical) following. Undoubtedly, this attachment results from users' experiences in building the H8 from scratch, because the machine's capacity—4K to 64K memory and 2 MHz of speed—is easily surpassed by newer computers. While the H8's glory days are behind it, the machine's place in history has been assured—an H8 is now part of the collection of the Smithsonian Institution.

The 16-bit **H11** also made its debut ten years ago. Despite being similar in appearance, the H11 never caught on as the H8 did. The H11 was a kit version of a Digital Equipment Corp. LSI-11, designed for use in the business/scientific workplace. Unfortunately, much of the software for the machine was developed for institutional budgets, so hobbyists stayed away.

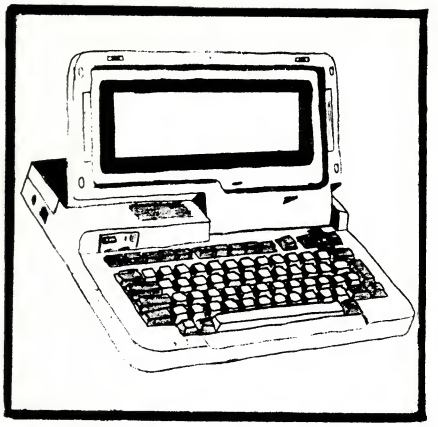


The **H/Z89-90** series came onto the scene in 1979, and included the '89, with hard-sector disk drives, the soft-sector '90, and the '88, which had a cassette-tape interface only. The popular '89 continues to claim a following as loyal as the H8's. Its all-in-one design, unusual for its day, was created with business users in mind. The real market for the '89, however, turned out to be the hobbyist, who was attracted by the opportunity to assemble a computer from a kit. This series, based on a Z80 CPU, moved Heath into the world of the CP/M operating system, and eventually got a redesigned circuit board, due to Federal Communications Commission regulations on computer-generated radio-frequency radiation.

The **H/Z100** series was introduced in 1982, and consisted of the color-capable **Z110**, and the monochrome all-in-one **Z120** (pictured here). This series left the earlier Heath/Zenith computers in the dust: the machines came with a minimum of 128K of memory, double the maximum of the older models; and their much faster run times and ability to run a variety of software were major breakthroughs for Heath/Zenith computing. Having dual microprocessors (8088 and 8085) helped, of course. And the Z110 and '120 also provided lots of room for memory expansion.

Other members of the Z100 family include the **'111** and **'121** (half-height drive versions of the '110 and '120, respectively); and the **'118**, whose speed of 8 MHz almost doubles the 5 MHz of the rest of its family.

The **H/Z138** is the transportable version of the '148. Both are members of the '150 series of computers compatible with the IBM Personal Computer. One of the 24-pound computer's distinguishing features is its screen, which measures a mere seven inches diagonally.



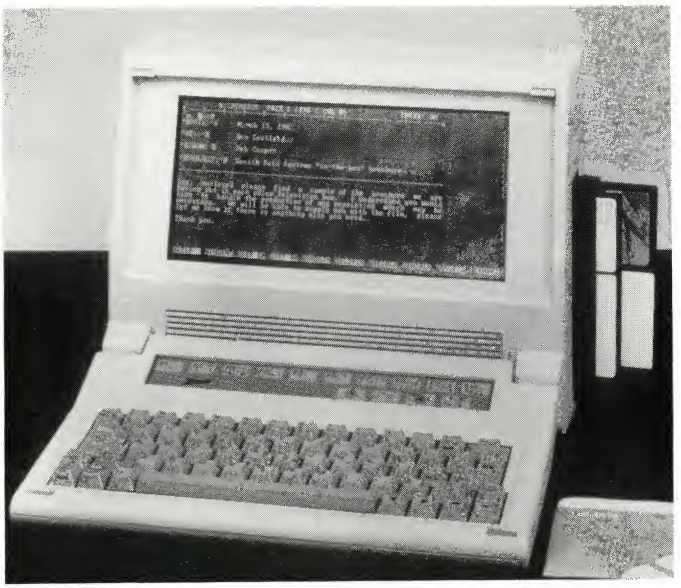
Zenith's first laptop is the **ZP-150**, introduced in 1985. The ZP-150 has no disk drives (the operating system and software are ROM-resident). This might be why it weighs only eight pounds—easily Heath/Zenith's lightest machine. The ZP-150 can also fit into most standard attaché cases, making it a truly portable portable. Despite these qualities, the ZP-150 never moved into quantity production.

The **H/Z148** is the "middle child" of the '150 series of IBM-PC compatibles, and has much in common with its family. The '148 served as the model for its portable sibling, the '138; and it has the same clock speed of another relative, the '158, but not, however, the '158's higher price and greater expandability.

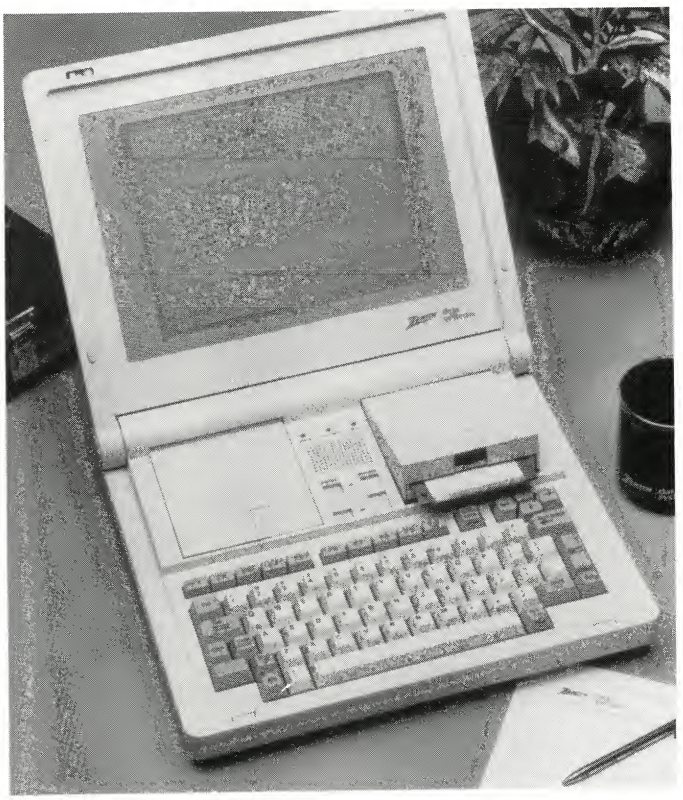
The **H/Z160** is another Zenith portable, but its weight of 42 pounds makes it as practical as carrying around an air conditioner. (A *Sextant* reviewer noted that only a company with decades of experience building television sets would consider this machine a portable.) Despite its impracticality, the '160 is IBM-PC-compatible. However, the computer was discontinued a year after its February 1984 introduction. As the same *Sextant* reviewer put it, the '161 is a fine machine trapped in a second-rate box.

The **H/Z150** series, born in 1984, was Zenith's initial, and almost perfect, IBM-PC clone. This series returned to a single CPU (the 8088), and could not offer the same high-resolution graphics as the '100 series. (There was a price to pay for conformity—but there also was plenty of IBM-PC software just waiting to be run.)

There are some variations on the '151 basic model: the speed-switchable (4.77 MHz to 8 MHz) **'158**, later superseded by the **'159** (pictured here) and its increased video options; and the **'157**, a slower version of the '159.



The **Z171** is yet another portable, described by one *Sextant* author as looking "a lot like a lunchbox." (But, at just under 15 pounds, it weighs a bit more than one.) The '171 was announced in 1985, and thousands were sold to the Internal Revenue Service the next year. The 80C88-based '171 comes with 5¼" disks. Later versions have the "twisted crystal" display first featured on the '171's younger cousin, the '181.



The **Z181**, introduced in 1986, is a smaller-sized version of its predecessor, the '171. Disk size is 3½", and the 80C88-based '181 weighs a mere 12 pounds. But its biggest attraction is the "supertwist" LCD screen, which offers high contrast and is easier on the eyes than other LCDs. An enhanced version of the machine allows switching from 4.77 to 8 MHz, provides more battery power, and is expandable with an external hard-disk drive. The **Z183**, which made its debut in early 1987, adds an internal 10-megabyte hard disk.

Zenith's 1985 contribution to the "Clone Wars" was the 80286-based **H/Z200** series, compatible with the IBM PC AT as well as with the '150 series. Compared with its ancestors, the series offers more of everything—speed, power, memory, and storage.

The **'241** is the oldest member of the '200 branch of the family. Next in line is the **'248**, with more speed and disk capacity than the '241. The '200s are considered ideal for multi-tasking and multi-user environments.

Zenith went beyond IBM compatibility in the spring of 1987 with the 80386-based **Z386**. The Z386 is an MS-DOS machine, but it also runs Xenix. It is the fastest model available, ideal for desktop publishing, local-area networks, artificial intelligence, computer-aided design, and program development.

The **eaZy pc**'s June 1987 introduction makes it the newest member of Zenith's family—all the letters in its name haven't even grown up yet. With its text and graphics appearing in black on a white background, it looks a bit like Apple's Macintosh. The eaZy pc, an MS-DOS machine, is aiming to be a populist computer—it's easy to use, and inexpensive.

"BOOST YOUR PRODUCTIVITY WITH A BUNDLE OF FAST, POWERFUL SCREEN AND KEYBOARD UTILITIES!"

- Speed up your screen writing 2-6 times!
- Add zip to cursor keys 2-5 times!
- Get back up to 800 scrolled pages!
- Save valuable scrolled info to disk
- Free your eyes from scroll blinking
- No more annoying typeahead beep
- Prevent screen phospher burnin
- Shorten that annoying bell
- Get 43 line EGA support
- Extend your ANSI.SYS to VT100
- Add many more escape sequences
- Over 60 useful options!
- Easy installation
- Works well w/thousands of programs
- Used by thousands since 1984!

"The Best of the Best Utilities"
—***PC Magazine*** Jun 23, 87 pg 281.

"The implementation of all the services are at least as good in Fansi-Console as in any competitor"
—***Capital PC Monitor*** May 86 pg 25.

"Another of those unheralded gems I would not wish to live without"
"Clear, readable, highly professional manual, excellently typeset"
—***Computing Canada*** Feb 5, 87 pg 25.

Fast ANSI Console Driver

Fast ANSI Console Driver

FANSI-CONSOLE™

The Integrated Console Utility™

Pay Less and Get More!

ONLY $75!

(plus $4 s/h in 48 states)

400p Manual (w/slip case)
and 2 Copyable Disks
With No Risk, 60 Day Money-Back
Satisfaction Guarantee

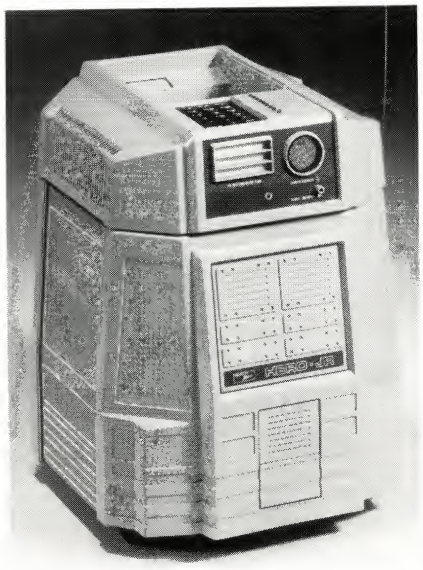
CALL (313) 994-3259 NOW
to order with Visa/MC/AmEx

HERSEY MICRO CONSULTING, INC.
Box 8276, Ann Arbor, MI 48107

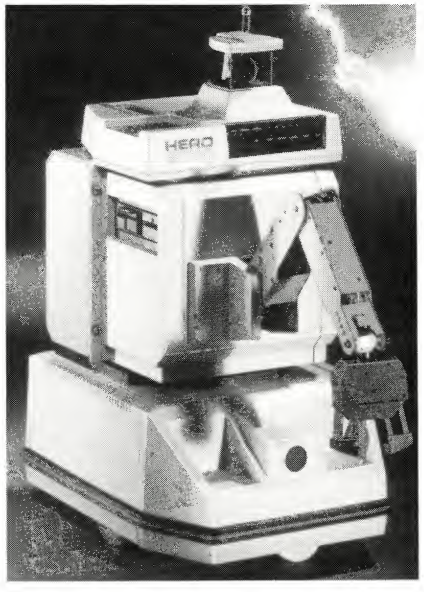
Circle #168 On Reader Service Card
To Get FREE Brochure w/Reprints
DEALER INQUIRIES INVITED

Circle #168 on Reader Service Card

HERO I is a 6808-based computer on three wheels. It's also a bit of an entertainer—it will even sing "Happy Birthday to You." But mostly, HERO, which stands for Heath Educational Robot, is an educator, teaching its users about robotics and programming.

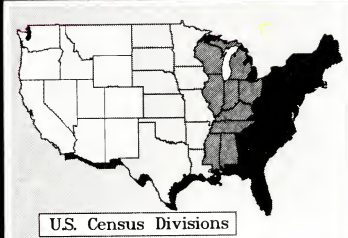


Although a chip off the old block in both appearance and processor, **HERO Jr.** is much easier to use than its father (or is it mother?), HERO I. It's a fully pre-programmed personal robot, with 32K of memory to carry out such useful jobs as waking its master, or acting as a security guard. And since HERO Jr. also speaks a few languages (English and "Roblish"), its owner need never feel lonely.



Based on its looks and its features—a 16-bit 8088 master microprocessor, plus eleven 8-bit peripheral microprocessors—the **HERO 2000** appears to be an intimidating creature. The 2000 needs to be tough, though, because it's an automation trainer, for use in programming and testing robotics and automation experiments. Disk drives are optional.

For the Z100
WITH ShowOff YOUR GRAPHICS WILL BE OUTSTANDING



High Resolution Advantages
- Professional Appearance
- Special Effects
- Less Distortion

Improve your presentations and reports with ShowOff, the hi-res graphics editor for the Z100. ShowOff helps you draw, paint and include text to create outstanding graphics.
640 x 480 resolution
92 fill colors • 92 patterns
25 text styles
Easy to use, ShowOff will also display and enhance MacPaint pictures, Lotus graphs, CAD drawings, and other graphics.

ShowOff $79 ShowOff with Logitech Mouse $174 demo disk $3
ShowOff with Epson Laser Printer $CALL
ShowOff versions are available for Logitech, Microsoft, and PC Mouse; HIPAD and Summagraphics digitizers.
Order direct • VISA • MASTERCARD • check • CALL TODAY
min requirements: Z100 • COLOR RAM • 384K RAM • MS-DOS 2.0

HOGWARE

HOGWARE COMPANY
470 BELLEVIEW
ST LOUIS, MO 63119
(314) 962-7833

Circle #144 on Reader Service Card

I NEED *SEXTANT!*

Start my subscription right away!

Enter my subscription for:
- ☐ 12 issues for $29.91 ($34.50 to Canada)
- ☐ 6 issues for $17.97 ($21.00 to Canada; $25.00 overseas via surface mail; $40.00 via air mail)

Payment terms:
- ☐ Payment enclosed (checks must be in U.S. dollars payable on a U.S. bank)
- ☐ Bill me
- ☐ Charge my: ☐ Visa ☐ MasterCard

Card # _____

Expiration date _____

Name _____

Address _____

_____

_____

We'll start your subscription with Issue #31 (November-December 1987), unless you request otherwise.

S30-S

I NEED *SEXTANT!*

Start my subscription right away!

Enter my subscription for:
- ☐ 12 issues for $29.91 ($34.50 to Canada)
- ☐ 6 issues for $17.97 ($21.00 to Canada; $25.00 overseas via surface mail; $40.00 via air mail)

Payment terms:
- ☐ Payment enclosed (checks must be in U.S. dollars payable on a U.S. bank)
- ☐ Bill me
- ☐ Charge my: ☐ Visa ☐ MasterCard

Card # _____

Expiration date _____

Name _____

Address _____

_____

_____

We'll start your subscription with Issue #31 (November-December 1987), unless you request otherwise.

S30-S

When mailing in an envelope,
please use ZIP code 20003.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 13098 WASHINGTON, D.C.

POSTAGE WILL BE PAID BY ADDRESSEE

BUSS/SEXTANT
716 E Street, S.E.
Washington, DC 20077-0860

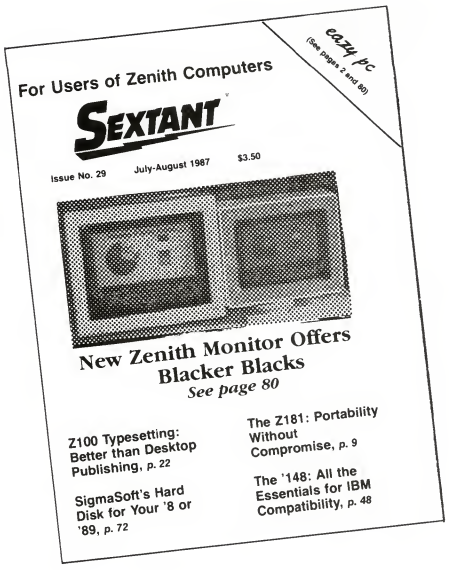
When mailing in an envelope,
please use ZIP code 20003.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 13098 WASHINGTON, D.C.

POSTAGE WILL BE PAID BY ADDRESSEE

BUSS/SEXTANT
716 E Street, S.E.
Washington, DC 20077-0860


For Users of Zenith Computers
SEXTANT
Issue No. 29 July-August 1987 $3.50
cazy pc
(See pages 7 and 80)
New Zenith Monitor Offers Blacker Blacks
See page 80
Z100 Typesetting: Better than Desktop Publishing, p. 22
The Z181: Portability Without Compromise, p. 9
SigmaSoft's Hard Disk for Your '8 or '89, p. 72
The '148: All the Essentials for IBM Compatibility, p. 48

YOU NEED *SEXTANT*

Save up to 28% off the cover price!

Your computer can do a lot for you—*if* you have the support you need. One source of support thousands of Heath/Zenith users rely upon is *Sextant* magazine—the *only* independent magazine about your Heath/Zenith computer. Whether you use an H/Z150, H/Z100, H/Z89, or H8, you'll find articles in every issue which apply to your system.

You can explore MS-DOS, Z-DOS, CP/M, and HDOS in *Sextant*. Applications, programs, compatible hardware and software, and the latest developments in the Heath/Zenith community are among the topics covered in every issue of *Sextant*. Regular features include:

"How-to" articles. Designed to help you enhance your system. Read how other users have altered their systems to suit their needs—and how you can too.

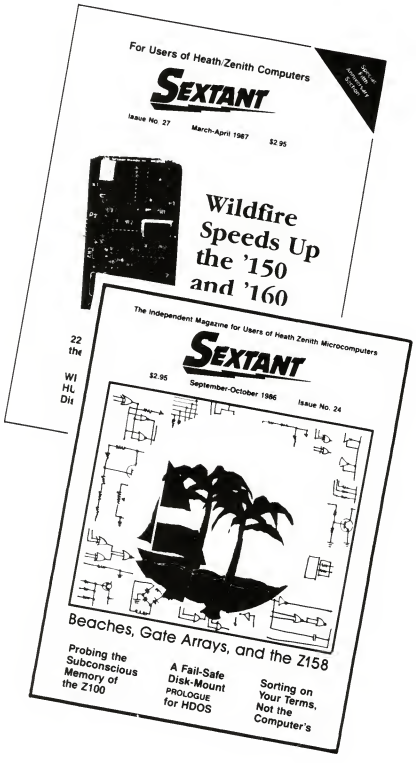
Reviews of products from Zenith and independent suppliers. Written to help answer your questions about hardware and software purchases you're considering.

Short program listings. These include utility programs and games, which you can use immediately.

Advertising by independent suppliers. You'll find many products advertised for your Heath/Zenith system that you just won't find anywhere else.

Coverage of community affairs. You'll read about major events, conferences, and personalities in the Heath/Zenith user community, and what effect they could have on you.

Don't miss all the information packed into each issue of *Sextant*!


For Users of Heath/Zenith Computers
SEXTANT
Issue No. 27 March-April 1987 $2.95
Wildfire Speeds Up the '150 and '160
The Independent Magazine for Users of Heath Zenith Microcomputers
SEXTANT
$2.95 September-October 1986 Issue No. 24
Beaches, Gate Arrays, and the Z158
Probing the Subconscious Memory of the Z100
A Fail-Safe Disk-Mount PROLOGUE for HDOS
Sorting on Your Terms, Not the Computer's

Start your subscription today!
Call Toll Free:
800/341-1522

(DATATEL 800™, for orders only, Monday-Friday 8 a.m.-9 p.m., and Saturday 9 a.m.-5 p.m., Eastern Time)

Or mail this coupon to:
Sextant, Dept. S30
716 E Street, S.E.
Washington, DC 20003

Please allow 6-8 weeks for delivery of your first issue.

Money-Back Guarantee

Your satisfaction with *Sextant* is completely guaranteed. If at any time you're not completely satisfied, just let us know and your money will be refunded—even for the issues you've already received.

I need *Sextant*!
Send me:
- ☐ 12 issues for $29.91 ($34.50 to Canada)
- ☐ 6 issues for $17.97 ($21 to Canada; $25 overseas via surface mail; $40 via air mail)
- ☐ Payment enclosed (Checks must be in U.S. dollars payable on a U.S. bank.)
- ☐ Bill me
- ☐ Charge my: ☐ Visa ☐ MasterCard

Card # _____

Expiration date _____

Name _____

Address _____

_____

_____

Sextant, Dept. S30, 716 E Street S.E., Washington, DC 20003

The Good, the Bad, and the Uncertain

Happiness, anger, and a little bit of doubt were just some of the emotions our survey of* Sextant *readers uncovered in the Zenith community.

Peggy Wallace

What could be better than a reader survey to vent one's spleen? Not much, it seems. Nearly two-thirds of the 210 *Sextant* readers surveyed for our celebration of the tenth anniversary of Heath/Zenith computers took the time to respond to our four-page questionnaire with their comments, complaints, and compliments about the Heath/Zenith community.

These readers had expressed an interest, via reader service card, in participating in the survey, which was mentioned in a recent issue. The 135 people returning the survey we sent them had only a few weeks to respond, but the answers came back fast and, at times, furious.

In a previous survey, conducted for issue #27 (which commemorated *Sextant*'s fifth anniversary), many respondents said they were upset with Heath/Zenith's "abandonment" of them. The present survey group appears to share that sentiment. They're upset with the lack of support for older machines and the scarcity of some software. They're concerned about Zenith's future, as well as that of the Heath/Zenith users' community.

However, those weren't the only topics they chose to complain about—and they also didn't always complain. But before we get into that, let's see who these people are, what kind of computers they use, and what they use them for.

Who's who

Well, there is no definitive answer on who they are—the highest number said they are engineers, but 24 out of 135 is hardly an overwhelming amount. There were several returns from members of the military, active and retired; a handful of consultants; and several people involved in computer work or electronics. We also heard from an attorney, a psychologist, a planner, a genealogist, and a mailman, among others.

The diversity among this group is evident not only in their occupations, but also in the computers they use. (Several of them use or own more than one.) The highest number of respondents—48—use a Z100, closely followed by 40 '89 users, which is why many comments focused on the advantages, disadvantages, problems, and benefits of these machines. The next largest group is the '150 users (26), followed by those who use the '240 series (18). Nine H8 users wrote in.

> ***Most respondents feel their Heath/Zenith machines are superior to other machines in just about every way.***

Twenty people admit to using the IBM PC, AT, or XT along with their Heath/Zenith machines. Several other non-Heath/Zenith machines were mentioned as well. Virtually everybody uses MS-DOS, but CP/M and HDOS made respectable showings, and numerous other operating systems are also being used.

Putting the computers to work

What do those surveyed use this variety of machines for? Well, there's an awful lot of word processing going on out there, because only 21 respondents specified they *don't* use their computers for this purpose. Other common uses are management of finances and information, and programming (with several noting that they learn the language as they program). Heath/Zenith machines are also put to such uses as analyzing the stock market and tabulating bowling-league scores. More respondents (74) use Heath/Zenith machines at work than don't (58), with three not specifying; and 73 people are using Heath/Zenith machines for the first time, as opposed to 53 old hands (and nine no replies).

What's so great about your computer?

Despite many first-time encounters with Heath/Zenith machines, all but 16 respondents have used at least one other brand of computer. So there was plenty of experience to draw on in answering our question on how other computers compare with/differ from Heath/Zenith machines. This question was where respondents moved beyond mere data into issues.

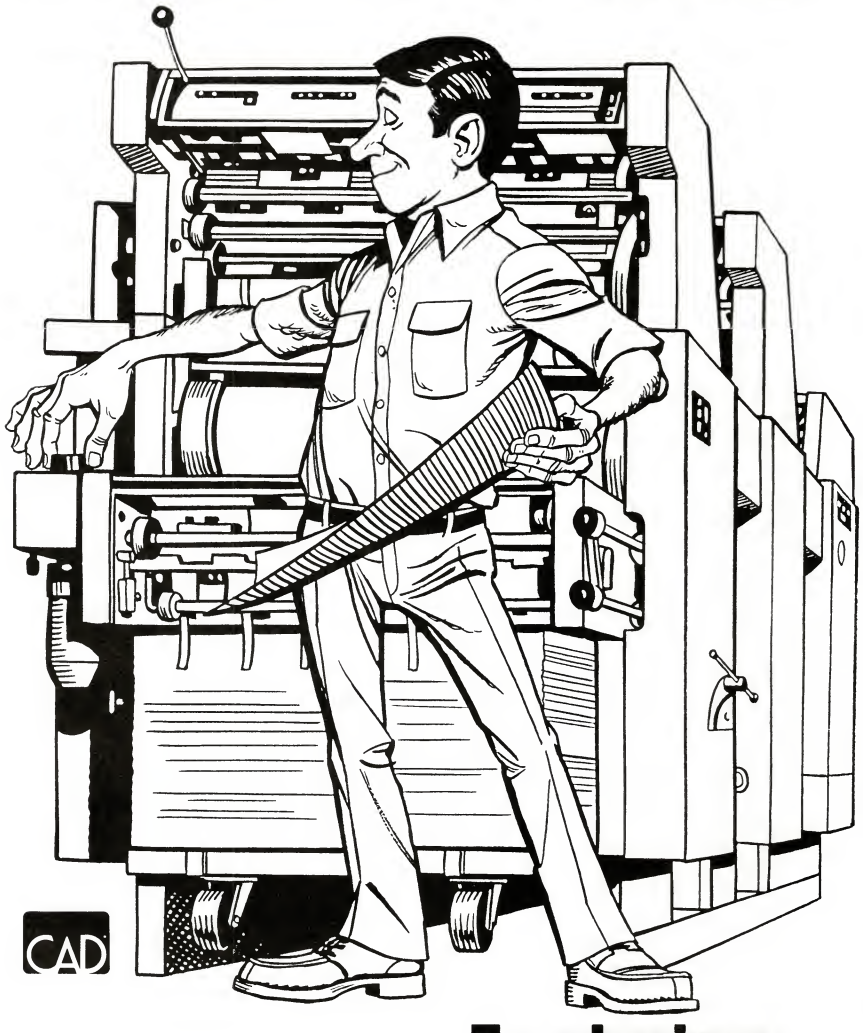
Most respondents feel their Heath/Zenith machines are superior to other machines in just about every aspect. Indeed, the comment of William M. Sipher of Hollomon AFB, New Mexico, that "Zeniths are best in my book—no one else comes close," may have been the most glowing, but was by no means unusual.

The faster speed of Heath/Zenith computers was the most commonly cited difference from, and improvement over, other brands (although one reader said the Z159 has the slowest disk drives he's ever seen). However, several other favorable traits were mentioned. Mike Wolfson of Ashland, Ohio, may have touched upon all of them: "Overall, I think that the Heath/Zenith computers are better. I prefer them from the standpoint of reliability, completeness of documentation, features, software, compatibility, and service."

The opportunity to expand or modify Heath/Zenith products, in comparison with other machines, also rated highly with many respondents. Several appreciated that the earlier-model Heath/Zenith machines were built for people who like to tinker. But a few also noted, as fans of

Peggy Wallace is Sextant*'s editorial assistant. She's a native of New Hampshire, and likes to play softball and attend baseball games.*

Hot off the Press.



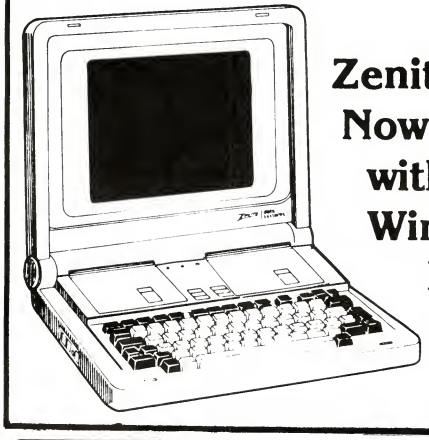
First Capitol Computer's Summer/Fall 1987 Catalog

It's here at last and better than ever! Our new Summer/Fall 1987 Catalog has it all - from Amstrad to Zenith and Ashton-Tate to Xerox. There are 52 pages packed with computer products for any user.

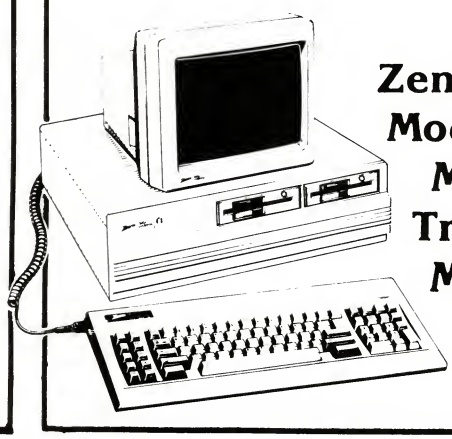
And if a special system is what you need, we've got it. You'll find special prices on our customized LAN packages and CAD systems. Don't forget to check out the Zenith SuperSystems that have given us our reputation. We can also put together a Custom Quote on your own system configuration.

Call or write to get your free catalog. (Note our new address and phone number.) Grab one while it's hot off the press!

Featuring . . .



Zenith's Z-183 Now available with 10 mb Winchester Drive



Zenith's Z-386 Model-40 and Model-80 True 32-bit Machines

First Capitol Computer

16 Algana Dr.
St. Peters, MO 63376-3930

1-800-TO-BUY-IT (800-862-8948) orders and quotes
1-314-447-8697 technical support and order status

Before you buy . . . . . .

Call Us First. And Last.

Circle #206 on Reader Service Card

the early Heath/Zenith machines often do, that the kit-building enthusiasm on the part of the manufacturer is disappearing. "Unfortunately, the field is now dominated by the [IBM] PC and clones," wrote Richard Holmes Anderson of Denver, Colorado.

And, some think, this has damaged the quality of latter-day Heath/Zenith computers. "At least in the early days, the Zenith computers were better designed and better documented. Now they are all the same," said Larry R. Ochs, of Norwich, Connecticut.

Shortcomings of the older-model Heath/Zeniths, such as the slow speed of the H89, *were* acknowledged by their users. These users are also aware that hard disks and increased memory are available in other machines, but added that they liked their computers better anyway.

Coming in for the most criticism on the other side of the fence was the keyboard for IBM computers, which was routinely described as "lousy." Respondents added that other brands' graphics are not as good as Heath/Zenith's, both for monochrome and color monitors. There was one reader, however, who felt that most other computers, except for the IBM PC, have better graphics than do the Heath/Zeniths.

What's so great about Heath/Zenith?

When it comes to dealing with computer companies other than Heath/Zenith, 82 said they have, 52 said they haven't, and one didn't say. Opinions were split almost evenly between those who think Heath/Zenith is far more responsive than the competition, and those who think the company lags far behind others.

Among readers who feel Heath/Zenith is better, several noted that the company has very good, and often free, technical support, unlike most other companies. Many also said that they found service at the Heath/Zenith Computers & Electronics stores to be personal and helpful. (However, there were some strongly negative opinions about the Heath stores; we'll get to those later on.)

Even among some of the positive replies about the stores, however, there was one reservation. Wrote James F. Helt of Rockville, Maryland: "The Heath/Zenith store personnel are generally much more knowledgeable and helpful. They know their products. On the other hand—if you know what you need/want, you can often get a better price at a competitor." Several other readers commented that products found at other computer stores could generally be bought for one-third less than the price charged at Heath/Zenith stores.

Some computerists who have been around since the days of the first Heath/Zenith machines are not happy with the changes the company has undergone over the years. "Heath/Zenith is not as responsive as Heath was before," said William H. Stanley of Madison, Wisconsin. He believes support to stores is poor, and so are the company's software upgrade policies. This latter opinion was shared by many. Thomas P. Currie of Valley Station, Kentucky, wrote, "They don't simply lag by some reasonable period of time (such as 90 days), but actually seem content to run one or more full versions behind." (For a look at Zenith Data Systems' software update policy, see "Exploring Zenith's Software Update Policy" by Wayne Rash, Jr., elsewhere in this issue.)

However, Stanley's and Currie's comments are mild compared with those of H. T. Goranson of Virginia Beach, Virginia. Goranson wrote, "I despise Heath. They have gone from a group supporting grassroots innovation to just another vendor, following trends."

Then there are readers who have no strong opinion about the quality of Heath/Zenith's service—they feel the offerings of the various computer companies are generic. And there's the lucky experience of Charles M. Taylor, Jr., of Glendale, Arizona, who said, "So far I have not had problems with anyone."

Z-100 PC Expansion with ZPAL™

Z-151/Z-161 Users
Use 256K bit memory chips on the original memory board. Extend the memory to 640K or 704K bytes with ZPAL-2 Decoder **$29.00**

Z-158 Users
Extend your system to 768K bytes with 3 banks of 256K bit memory chips and ZPAL-158 decoder.
ZPAL-158 Decoder **$36.00**

Z-138/Z-148 Users
Extend your system to 768K bytes with 3 banks of 256K bit memory chips and ZPAL-148 decoder.
ZPAL-148 Decoder **$36.00**

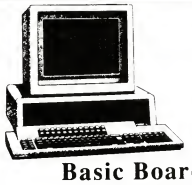
Z-100 PC Expansion with COMPAL™

Z-151/Z-161 Users
Instead of disabling COM2 when using an internal modem or multifunction board, MAP it to COM3. Package includes driver software.
COMPAL-3 decoder **$39.00**
ZSTEMpc-VT220 — latest release supports COMPAL-3.

KEA Systems Ltd.
2150 West Broadway, Suite 412,
Vancouver, B.C. CANADA V6K 4L9
Technical Support (604) 732-7411
Order desk (800) 663-8702 Toll Free
Telex 04-352848 VCR
VISA and Mastercard Accepted
30 day money back guarantee.
Quantity and dealer discounts available.

Trademarks ZPAL, COMPAL — KEA Systems Ltd.

Circle #171 on Reader Service Card



IBM-PC IN An H / Z-100

Basic Board W / HUG Software $149.00
HUG ZPC V2 & UPGRADE
Both Included
An $80.00 Value
This EXCELLENT COMBINATION is used by many universities, colleges and the U.S. Naval Academy.

Options Available
•No Solder H / Z-100 Mod Kit $5.
•COM 1 $44. •COM 2 $39. •Clock $44.
•8Mhz V20's $11.
•8Mhz Interrupt Kits, $12.

H / Z-100 Requires Modifications and 768K of RAM
CHECKS AND M.O. IN US FUNDS, VISA AND MC ACCEPTED
US ORDERS ADD $4.00 S & H, APO & FPO ADD $7.00 S & H
CA RESIDENTS ADD SALES TAX

IBM-PC is a resgistered trademark of IBM Corp.
ZPC is a product of the Heath Users Group

OTHER MFR'S PRODUCTS at LOWEST PRICES
HARD DISK DRIVES

Seagate
20mb ST225 .....$259. • (w/cont.) $319. • (w SCSI cont.) ...$410.00
30mb ST238 .....$279. • (w/cont.) $365. • ST4038 .....$555.00
Z / 100 ST225N + CDR-11B Interface Board $725.00

MiniScribe
20mb M8425 .....$275. • (w/SCSI cont.) $425. • M3425 ...$264.00
30mb M8438 .....$299. • M3438 .....$289.00
Z / 100 M8425S + CDR-11B Interface Board $745.00
Call or write for information on other sizes & brands.

CDR-ZS100 Speed Module $45.00
GRAYMATTER Application Software Z-MAX $49.00
FBE Research Company, Inc. ZMF100a $59.00

SPECIAL ANNIVERSARY OFFER
SL WABER: 6 Outlet Power Strip
15AMP • Surge & Noise Suppression $12.50
All prices are plus S & H
Call or write for further information
Scottie Systems
2667 Cropley Ave. #123
San Jose, CA 95132
(408) 259-6226

Circle #111 on Reader Service Card

Buying now and buying later

Despite the negativity some respondents direct towards Heath/Zenith, there's plenty of willingness to continue purchasing more computer products, particularly upgrades for present systems. Almost everyone—122 respondents—said they planned to purchase additional upgrades or applications, while only nine answered they did not. There were four maybes. Interest waned slightly when it came to buying a new computer—while 87 said they would, 37 answered no. The remainder said maybe, or didn't answer.

Because of this eagerness to buy, readers pounced when we asked them to look into the future and tell us what new computer products they'd like to see produced, both for their machines, and in general. Just about everyone came up with more than one hypothetical product.

Respondents dreamed up fast icon-based operating systems, faster-than-ever machines, and read/write laser disks. Also included on their imaginative lists were voice-controlled I/O devices and controls, extremely accurate and inexpensive plotters, stereoscopic monitor screens, portables with large memories, and hard-disk laptops. This last item *is* available—in the form of the '183. (See "The Z181: Portability Without Compromise," *Sextant* #29, July-August 1987.)

Indeed, many of the products that readers would like to have for their *current* computers do exist, but, as Ken Wright of Grayling, Michigan, explained, "I just need the money to buy it!" Readers would like to see more affordable hard disks, laptops, and laser disks. H8 owners are looking for the right price on add-on cards; the '89 users are searching for less expensive Winchester drives, RAM drives, and improved speed, among many other things. Z100 owner Larry St. Llion of Columbus, Ohio, would like a less costly motherboard to make his machine more IBM PC-compatible because, "at present, it's cheaper to buy another machine." And Minneapolis resident Dennis McGuire explained, "I have put off even small purchases (like the V20) because I expect to need an AT clone soon."

Many owners of older computers noted that their wish lists are just that, because their machines are no longer supported. As Livermore, California, reader William Derby explained, "It is not realistic to expect much [that is] new for the H89 . . . it would be nice to see 3½" drives that would just plug in to the H89—but I don't expect this." Derby was one of several respondents who feel overwhelmed by the sheer number of existing computer products. "It's hard to keep up with the products already available and those that are always rapidly becoming available," Derby wrote.

The good and the bad

Respondents were asked to name the two greatest problems and the two greatest benefits in the use of Heath/Zenith computers. Some readers stuck to machine-specific problems, such as defective chips and software, the lack of business software for the H8 and H89, the noise of the '100's fan, and failure of a floppy-disk drive. But many readers brought up more emotional subjects.

The theme of "abandonment" or "orphaning" of older Heath/Zenith machines was one of them. (Often mentioned during discussion of this issue was the '100, "the best machine ever built," according to one reader.) Several readers are upset about the obsolescence of their machines: "Why does Heath/Zenith keep issuing new computers and then dropping them?" wrote one anonymous reader. They're also upset about the lack of software and support caused by Heath/Zenith's decision to become a "cloner," as some put it; and they're not thrilled about the expense of upgrading an orphaned computer to fit into the compatible world.

But other readers have little patience with the "orphan" theme, and even believe that such an attitude *is* one of the problems. Tom Putnam of Ft. Ord, California, spent a good chunk of the two-page letter he sent along with his finished

Z-100
PROGRAMS FOR KIDS
Letters & Numbers
Mother Goose
Little Wizards
Preschool Challenge
Alien Faces
$29.95 each
Educational, graphic program packages for kids. Z-100, CP/M-85 or 86 and MBASIC required. Call or send for free descriptive flyer.
Intuitive Logic
412 Taylor Street
Rochester MI 48063-4327
(313) 651-3859
Circle #103 on Reader Service Card

Make QUERY III your key to a world of information...
Finally, a database management system you don't have to go to school to learn how to use.
Our system is so easy to use, you'll be up and running 10 minutes after you open the package. It's so versatile you'll never outgrow it. QUERY III is written in assembly language for super fast sorts and searches, and it's written with the user in mind, with lots of help menus and safety features built in. Eleven programs provide all your fundamental needs: Create, Add, View, Sort, Search, Printer, Writer, Redesign, Purge, Recover, and Autopro.
QUERY III user, Nat Sherrill of Sherrill Cellars, in Remark, October '85, says: "Might I suggest QUERY III published by Hoyle & Hoyle. For just $100, you get an extraordinarily well developed package of routines that easily match the performance of the over-advertised, over-priced and under-performance "hot-stuff" we always read about."
Hoyle & Hoyle Software, Inc.
111 Sparrow Drive
Isle of Palms, SC 29451
(803) 886-5802
Available in HDOS, CP/M, MS-DOS, Z-DOS, PC-DOS.
Order now or write for further information about QUERY III and support software.
$99.95 Visa, MC, Choice, COD, or check. Shipped next working day.
Circle #113 on Reader Service Card

Hero 1® Programming The Best Way!

Hero 1®- IBM Development System

Includes:
Cross Assembler/Compiler
Interactive Debugger

Requires:
IBM compatible with 256K RAM
Hero® serial interface and 1.3 ROM

Features:
- 9600 baud serial communications
- Macro library for Robot Language
- High level 6800 Assembler with:
  —IF...THEN...ELSE...ENDIF
  —FOR...NEXT
  —WHILE...END WHILE
  —Function Calls
- Debug on PC screen with symbolic disassembly, breakpoints, and single-step
- Demo programs and tutorials

Costs:

Assempiler™ 6800	$ 99.00
Symbolic Debugger	$ 29.00
Both for:	$119.00

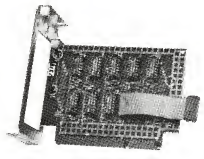
Free Shipping
Illinois residents add 8% sales tax.

Order and Info:
Zyxx, Inc. P.O. Box 4194
Arlington Heights, IL 60006
312-870-0938

Assempiler is a trademark of Zyxx, Inc.
Hero is a trademark of Heath Electronics.
IBM is a trademark of IBM Corporation.

Circle #237 on Reader Service Card

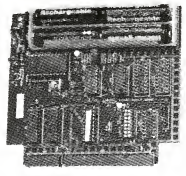
HEATH/ZENITH 88, 89, 90 PERIPHERALS

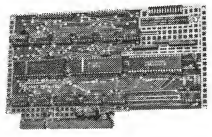


16K RAM EXPANSION CARD

Only $65.00
Shipping & Handling $5.00

REAL TIME CLOCK
Price $130.00 with Batteries
Shipping & Handling $5.00
$114.00 without Batteries





2 PORT SERIAL
3 PORT PARALLEL
I / O CARD

Price $199.00
Second Operating System Driver $25.00
Shipping & Handling $10.00

Secured Computer Systems

PRICES ARE LESS SHIPPING & TAX IF RESIDENT OF CALIFORNIA.

MAIL ORDER: 12011 ACLARE STREET, CERRITOS, CA 90701
(213) 924-6741

TECHNICAL INFO / HELP:
8575 KNOTT AVENUE, SUITE D
BUENA PARK, CA 90620
(714) 952-3930

TERMS & SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE
VISA & MASTER CARD GLADLY ACCEPTED

Circle #157 on Reader Service Card

survey discussing this issue. "Somewhere along the line, these people are going to have to realize that Heath/Zenith is in business to make money, *not* to keep a (relatively) small number of hobbyists happy." About the '8 and '89, he asks, "Were they good machines? Yes, of course they were—and still are . . . if they do what their owners want and need. But I don't think they could survive in the office environments of today when they would have to compete with integrated programs (Lotus, Symphony, and others), pop-up utilities (Perks, SideKick, etc.) and other phenomena that the newer technology brought (and is still bringing!)."

Minding the store

The most vocal dissent was directed towards the Heath stores, which some respondents feel offer subpar service. Kevin Long of Pfafftown, North Carolina, said that when he tried to solve a problem with his machine through a Heath store, he was given "bad parts," and "generally got the feeling that I was wasting their time."

While Daniel Gilbertson of Richland Center, Wisconsin, countered this claim of poor service—he's received diagnostic help, and had parts shipped to him after speaking with a company technician—he raised another common objection. Referring to the growing number of other computer brands appearing in the Heath stores, he said, "I hope Heath doesn't become a ComputerLand. It sometimes looks that way."

Another service problem that was surprisingly common among our readers was their dissatisfaction with Zenith's technical-assistance telephone lines. Many said they could never get through, and a few said they received little or no help when they did get through.

However, there are two sides to every story: Service from Heath/Zenith and its stores was also commonly cited as one of the biggest *benefits* of Heath/Zenith computing.

Computer commendations

The benefits question also provided people with the opportunity to sing the praises of their machines, and sing they did. "Reliable" was mentioned often, as was "quality design and materials." Many noted that the machines and, in some cases, the software, were easy to install, use, maintain, modify, and expand. Several commented on the precision graphics. There were also several glowing opinions about the documentation that came with the machines. (But, as with almost every response, there was at least one dissenting opinion—George L. Roberts of Gerrardstown, West Virginia, thinks the quality of Heath/Zenith's documentation is poor.)

Perhaps the biggest benefit for several respondents was the fact that their computers came in kit form. "Working with the Heathkit products has helped me to understand basic computer concepts better (both hardware and software)," wrote Allen G. Springer of Sidney, Ohio. And this leads to a feeling of comfort for users, or as William E. White of Miami, Florida, said, "I know what's in the box!"

Present—and future—concerns

Finally, we asked our survey group to tell us what they thought were the major issues currently facing Heath/Zenith. We also provided room for comment on any other aspect of the Heath/Zenith community that was important to them. And did they ever tell us!

Several respondents expressed concern that they could be priced out of the market, and urged the company not to forget what many of them called the "little guy." Many also suggested that the little guy, and the size of his budget, is being forgotten due to the large government contracts Zenith has received. "With the increased government involvement, it's possible that Heath/Zenith will forget about the individuals that [were] the basis for beginning the company," wrote Larry K. Kling of Raleigh, North Carolina. And Graeme C. Payne of Summerville, South Carolina, said, "Please don't forget us small guys who still think of $200 as a lot of money!"

There's a common belief that Zenith simply doesn't advertise enough.

Readers had plenty of other business advice for Zenith, too—especially when it came to the subject of advertising. There's a common belief among those surveyed that Zenith's computer division simply just doesn't do enough of it, and several noted that they hardly ever see any ads for Zenith computers outside the pages of *Sextant* and *REMark*. So people don't know what's available, or even that there is anything available. "To many consumers, Heath is still an 'electronics kits' company, and Zenith is a 'TV manufacturer,' " wrote Charles F. Mowery, Jr., of Brandon, Florida.

And what about IBM?

Then, of course, there's major concern about how Zenith will react to IBM's new Personal System/2 line of computers. As Matt Scherer of Topeka, Kansas, asked, "To ignore or emulate?" Several are of the opinion that the new IBM line is "junk," and won't last long. Others are afraid that Zenith will again opt for compatibility, and they will get burned one more time. "If Zenith jumps on the IBM bandwagon

again and supports the new line of [PS/2s] in lieu of continued support for present PC compatibles, they will lose many customers," predicted H. J. Wissig of Groton, Connecticut. Others believe that IBM has become the standard bearer, and Zenith should improve on the "new" standard, or at least be thinking of where to go as this standard changes.

And there were comments on the status of the Heath/Zenith community, which demonstrates just how important this issue is to those who responded. (Nary a survey respondent neglected to discuss at least one aspect of this subject.) Mostly, readers just want more support, recognition of their presence, and a better effort to support the older machines. Several noted that they are fed up with being ignored and with seeing new Zenith products steal away the support for their older machines. Some said they will not buy any future Heath/Zenith products because of this. One anonymous writer said he was facing the decision of "how to drop Zenith, or how to get decent support from them."

Others have serious reservations about what's happening to the Heath Users' Groups. Although there is almost universal support and enjoyment of the HUGs among those surveyed, there is also the belief among some that the groups are on their way out. Larry Ochs commented, "I think that the Heath/Zenith community has blended into the IBM-compatible community to such an extent that it doesn't exist currently except for the H8 [and] Z100 hobby people." Other readers theorized that there are three groups of users—the H8/89, Z100, and the PC—making up the Heath/Zenith community. (Some even believe that there's soon to be a fourth group—PS/2.) These groups, some respondents feel, will spur more competition than cooperation, dooming the sense of community and, as a result, the HUGs. H. T. Goranson believes the Heath/Zenith community is lost, unless "it can regain a user community in Air Force/Navy enlisted personnel. . .," while J. W. Torr of Ridley Park, Pennsylvania, suggests the HUGs be made stronger by continuing to develop their hobbyist and educational purposes.

Conclusion

Obviously, our readers have some strong opinions on the paths Heath/Zenith has travelled over the last ten years. While there is a mixture of applause and criticism for Heath/Zenith's products and actions, uncertainty marks the future. Most of our survey respondents seem unsure about where the company is going, and whether they want to follow. Perhaps the only certainty is that, regardless of whether they stay with Heath/Zenith, they'll have an opinion about the company's plans—and no hesitation about sharing it with anyone who asks. △

ZENITH LAPTOPS!

For Work • For School • For Vacation

Zenith 181
4.77 MHz & 8 MHz!

Zenith 183
Int. 10 MB Hard Drive
& Battery Operable!

NEW: Ext. 5¼" Drive for 8 MHz Zenith 181 & 183 In Slimline ½-Ht. Case w/Power & Cable

Also Available—
1) External 5¼" Drive & 3½" Drive For Other Laptops, IBM PC/XT/AT, PS/2 & Compatibles
2) 3½" Internal Drive For Your Desktop

Diconix Printer, SABA Hand-Scan "Pocket" Modems, Diskettes Other Laptops & Accessories Available

Call For Low Pricing
201-297-2502
Open 7 Days 9 a.m.-9 p.m., EST

Computer Options Unlimited
("The Laptop Specialists")

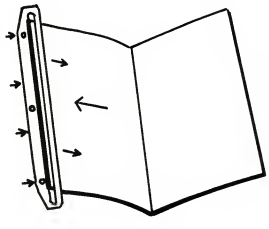
Circle #191 on Reader Service Card

Sextant Binder Interface Kits

Now you can interface your copies of *Sextant* to a 3-ring binder! Tough plastic Magazine Holders let you preserve, protect, and organize your copies of *Sextant* without drilling holes in them.

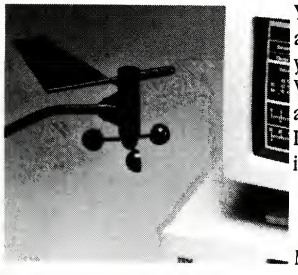
Each package of 12 holders costs only $2.95. To order yours, return the coupon with your payment today to Sextant Publishing Co., 716 E Street, S.E., Washington, DC 20003.

Instructions
1. Open magazine to center.
2. Slip pages through slot in magazine holder.
3. Slide holder to center of magazine.
4. Place magazine in any standard 3-ring binder.



I want 3-ring binder "holes" for my copies of *Sextant*!
Send me _____ packages of 12 magazine holders @ $2.95 each. Please add $.75 to your total order for shipping and handling.
☐ Payment is enclosed. (Checks must be in U.S. dollars payable on a U.S. bank.)
☐ Charge my ☐ Visa ☐ MasterCard
Card # _____ Expires _____
Name _____
Address _____
_____
Send your order to Sextant Publishing Co., 716 E Street, S.E., Washington, DC 20003

Add a weather station to your computer.



You know how much your computer already does for you. Now it can give you the weather as well. With PC WEATHER, you get all the hardware and software you need to turn your IBM PC, XT, AT or other compatible into a personal weather station.

Measure and Display
- ☐ Wind speed & direction
- ☐ Inside and outside temperatures
- ☐ Barometric pressure
- ☐ Wind chill factor
- ☐ Rainfall (optional extra)

- ☐ Real-time clock
- ☐ Programmable weather alarms
- ☐ On-board buzzer

$375 VISA/MC/AMEX Accepted
To order, call or write:
Technology Marketing Inc.
4000 Kruse Way Place
Bldg. 2, Suite 120
Lake Oswego, OR 97035
1-800-247-5712

Circle #182 on Reader Service Card

Exploring Zenith's Software Update Policy

And you thought they didn't have one.

Wayne Rash, Jr.

Like most computer companies that sell software, Zenith Data Systems must not only sell the software, it must update it as well. Providing updates is a complex, expensive process, but it's a service that Zenith software users have come to expect.

But it seems that some customers' expectations about software updates haven't always been realized. Looking into Zenith's software update policy, I found that the subject raised comments ranging from "It's wonderful" to "What policy?"

Why updates?

Normally, a company updates its software for one of two reasons. First, there may be a problem with it—mistakes were made when the program was written, they weren't found in time, and the program was sold containing these errors. If the errors have a substantial effect on the use of the product, the company will usually issue an update.

Second, updates can be the result of product enhancements. A software company often finds that, due to either competition or consumer demand, additional features are needed in its product. When the software is produced with these enhancements, it may be offered as an update to people who had bought the earlier version.

The Zenith process

The process is more complex for Zenith because the company does not originate most of the software it sells. Nearly all of the applications programs are published by some other company, such as Lotus, Microsoft, Condor, or Ashton-Tate. Zenith normally packages the programs, sometimes adding enhancements or upgrading manuals.

The software companies sell Zenith the rights to reproduce and distribute a program and its manual. Zenith then charges its own customers for the right to use the software. When Zenith negotiates for distribution rights with a software publisher, the two companies normally also reach an agreement on the update policy for each piece of software.

Wayne Rash, Jr., is a consultant with American Management Systems in Arlington, Virginia. He's a frequent contributor to Sextant *and other computer magazines.*

The update path

The update to your piece of Zenith software starts with Jack Frank. He's director of systems engineering, and works at Zenith Data Systems' headquarters near Chicago. It's Frank who keeps in close contact with the representatives of software houses, and who keeps track of a company's plans to update its software.

Updates take three or four months—if there are no delays.

Once he finds out about plans to update, Frank must determine whether or not Zenith will provide the update and, if so, when. During our interview, Frank noted that not all updates from Zenith suppliers are provided to customers. "Some companies provide an update every week or ten days," he explained. "We just can't afford that." Consequently, Zenith prefers to distribute enhancements only once a year. Frank pointed out, though, that this doesn't apply to updates needed to correct problems with the software.

Normally, the master disk for the update arrives at Zenith about 30 days after the update is first released to the public. At that point, Zenith begins any customizing that needs to be done. Examples include adding drivers for printers sold by Zenith. Once the drivers are written, they are sent to the publisher for testing.

Currently, Zenith is going through an update for Micropro International's word processing package, WordStar. During this process, Zenith has had to write drivers for a number of printers, and for the Z100 computer.

Customizing the program and manuals and producing the update takes from three to four months. At times, this is delayed when tests by Zenith uncover bugs in the software.

Sometimes the delay is so long that the manufacturer of the software releases another update in the meantime. When Frank finds out about this overlap, he may elect to wait until the new version is out, and begin again.

Updates from elsewhere

As the customization process gets longer due to a larger amount of Zenith hardware to support, the problem of long delays gets worse. So, when Microsoft upgraded Word to version 2, Zenith offered its customers the option of receiving the update directly from Microsoft. This appears to have been well received by Zenith's customers.

Frank explained that the update the publisher sells directly to the public may not always be suitable for Zenith users. This is especially true of programs with versions for the Z100—for which the publisher may not be offering an update. Also, the publisher's update may not include support for particular peripherals popular among Zenith users.

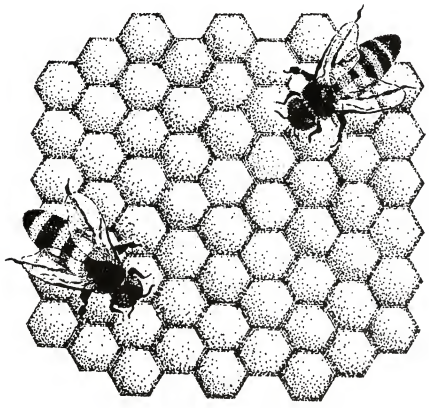
Occasionally, Zenith may originate updates itself (as it has done with the Peachtree Accounting System). But the company tries to stay away from those situations. "It's an incredible burden," Frank said.

Sending it out

Once work on the update is completed, Zenith must arrive at a price and distribute the software and manuals. This is the task of ZDS Product Manager for Software Skip Gwyer, who works in the Heath plant in St. Joseph, Michigan. Gwyer also oversees disk manufacture and documentation production, as well as sending notices to the owners.

The price of the update is controlled by several factors, the most important of which is the amount of royalty Zenith is required to pay the software publisher. In addition, Zenith must recover the costs of

Beyond IBM PC Compatibility:



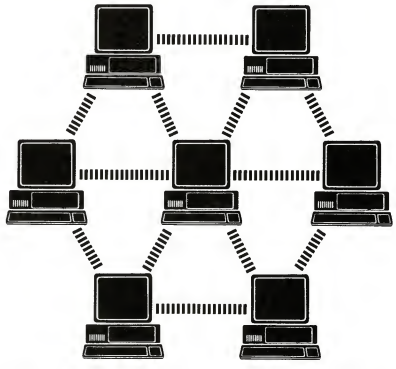
Z-100 users who are ready for PC compatibility, should keep one thing in mind. The future. New, state-of-the-art PC software is creating ever greater performance demands on computer hardware. Large scale, memory intensive programs for networking, graphics, number crunching and communications are quickly becoming the rule, not the exception. But software is only as good as the system that runs it.

EasyPC will run it all.

Even the newest copy-protected best sellers. That's because you actually boot up PC hardware, not software translation routines.

EasyPC runs faster, too.

Faster than an IBM PC, faster than a Z-150, and faster than any other emulation scheme you can buy.



EasyPC will support a fully integrated Local Area Network System (LANS) of Z-100's, PC's and AT's communicating at 115Kbaud.

Networking is now a reality for Z-100 users.

EasyPC will fully support a network of up to *sixteen* Z-100's, PC's and AT's. EasyPC is the core of an integrated system of components that includes RAM expansion, I/O, math co-processing, hard disk subsystem and more. For serious users, it's the only choice.

Ask to see an EasyPC in action.

Visit your Heath/Zenith Electronics Center or independent UCI dealer and see how easy it is to turn your Z-100 into a PC compatible system. For the name of your nearest dealer, just call 800-UCI-COMPUTER.

EasyPC is a trademark of UCI, Corp. Z-100 and Z-150 are trademarks of Zenith Electronics Corp.
IBM and IBM PC are trademarks of International Business Machines.

CORPORATION

948 Cherry Street, Kent, Ohio 44240
(216) 673-5155 / 800-UCI-COMPUTER

Circle #180 on Reader Service Card

ZDRAFT for Z100

Now shipping Version 2.0

New printers:
- HP LaserJet
- Epson LQ1000 24 pin

Command mode with many new functions.

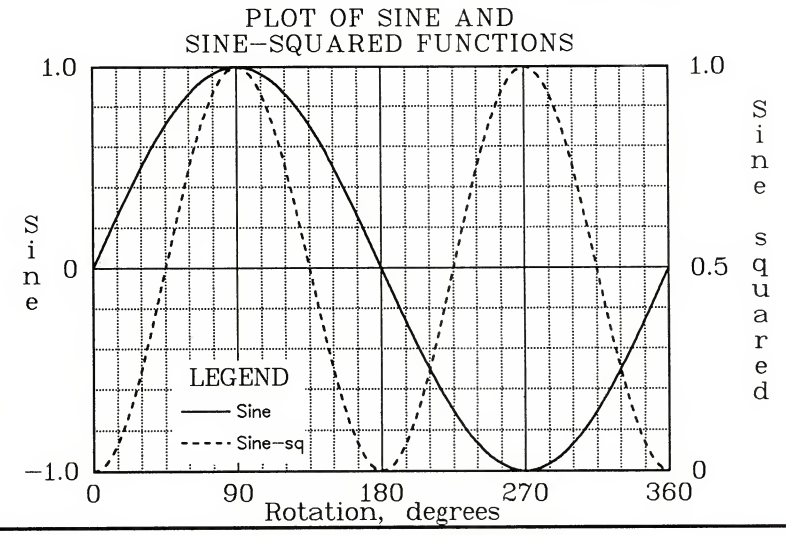
Greatly expanded text facility:
- Read offline text files
- Proportional spacing
- Micro justification

Command entry from files.

This entire ad is a single ZDRAFT drawing, made from an offline command file and printed on an HP LaserJet; no reduction for publication.

ZDRAFT is still $139.00; demo disk and manual are $25.00.

ETTS, Incorporated
P.O. Box 955
Renton, WA 98057–0955
(206) 226–3916

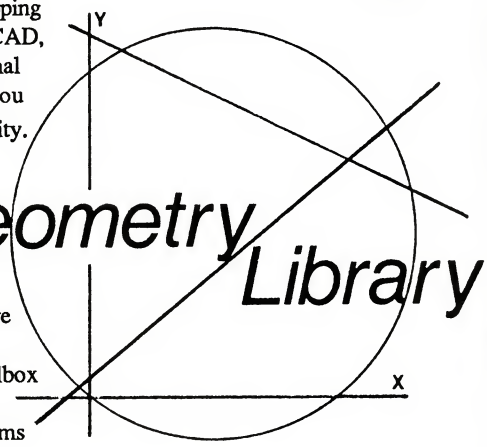


Circle #148 on Reader Service Card

TurboGeometry Library I

A Paul Scheibe Product

The added plus you need for developing sophisticated computer graphics, CAD, and programs that use computational geometry. This library will save you time, money and gives you flexiblity.



TurboGeometry Library

An excellent addition to Borland's Turbo Graphix Toolbox. If you are programming geometric routines TurboGeometry Library is the toolbox you need. Over 150 ready to use geometric routines. These algorithms range from low to high level in complexity. Such as • Equations of lines, circles, arcs & planes • Intersection of lines, circles, polygons • Curve generation • Location of points in space • 2 & 3 dimensional transforms • Polygon decomposition • Perspectives • Hidden line removal, and many more. Manual, full source code and sample programs. Requires: Turbo Pascal 2.0+, IBM PC (100% Comp), Zenith Z100 MS/PC DOS 2.0+ . All for just $99.95 US. Add $5.00 for SH. Texas residents add 71/4% Sales Tax. ORDER TODAY! MC, Visa, MO, Check. (214) 423-7288 .

Disk Software, Inc. 2116 E. Arapaho Rd., Suite 487, Richardson, Texas 75081
Turbo Pascal/Graphix Toolbox are TM of Borland Int., MS DOS is a TM of Microsoft

Circle #158 on Reader Service Card

customizing the software and providing any specialized drivers. Finally, Gwyer has to take into account the price that the publisher charges for the commercial version of the update.

The practices of the past have changed. "We don't do free updates anymore," Gwyer explained. The only exception to this is when an update is required to fix a major bug.

Some updates are simply incorporated into current production of the product, but not brought to the attention of existing users. (These are known as running changes.) Most changes to the Microsoft Disk Operating System (MS-DOS) happen this way. MS-DOS running changes are available to previous customers at a special price of $24 for the first disk and $12 for each additional disk, plus 10% for shipping. To get an update under this program, you simply send in your old disks along with a check, and you will get the latest version.

Once the price of an update has been decided, the notices must go out. Only users who have registered their software get the notices. "We would like our users to have the most current software, but we don't know who they are unless they register their software," Gwyer explained. Notification problems are compounded by the fact that people don't always let ZDS know that an address changes. Also, ZDS sometimes misses people who have registered.

Gwyer said that if registered users of Zenith software feel they are owed an update, they should call the Software Registration office in St. Joseph. They should also do this if they haven't registered their software; arrangements can be made to provide the update. Gwyer explained that the registration card or proof of purchase is normally required.

Does it work?

Now that we've seen how all of this gets accomplished by Zenith, the next question to ask, is "Does this update policy work?" I posed this question to users of Heath/Zenith software on CompuServe and on the Byte Information Exchange. I wanted to see if users are aware of how updates are handled, and if the system has been able to deliver updates to the users. (Only about 30% of Zenith's users are individual purchasers. The remainder are getting their software and hardware under some sort of contract between ZDS and their employer.)

The answer to my question, it seems, is "part of the time." Even Zenith dealers are sometimes mystified by the updates, and users appear to feel left out at times. One response that became common during the research for this article is the question, "What update policy?"

What's wrong?

Clearly, many Zenith users are less than delighted by the handling of updates

to their software. On the other hand, Zenith is committed to providing quality updates to its customers whenever feasible. Somehow, the implementation of that commitment is flawed.

In many cases, the problems with updates are beyond Zenith's control. Zenith can't begin the update process until it has received the master copies from the publisher. And it can't release an update until the update actually supports the equipment that Zenith's customers use. Likewise, Zenith has always tried to hold the level of documentation above the usual low standards of the rest of the industry, and documentation takes time to write.

While Zenith can do little to control most aspects of the update question, there are still some areas under the company's direction—quality assurance, which Zenith handles fairly well, and communications, which it doesn't.

Can Zenith do better?

One of the reasons that Zenith's customers complain about the company's update policy is lack of knowledge. Many remember the early days of Heath: Updates were often free, and they didn't come out as often as they do today. And many of us recall the pleasure of receiving a disk in the mail with a new copy of WordStar or HDOS. Those days are gone. Free updates would cost Zenith Data Systems an enormous amount of money.

In short, the customers don't know that there is an update policy, because they've never heard about it. The dealers, who might inform the customers, don't appear to know either. The result is users who don't know what to expect, and don't know who to ask.

The lack of communication is compounded by persistent reports of ZDS inaccuracies in software registration. True, many users fail to register their software, and others fail to keep their addresses current. But there are many who do not fit either category, and who still are not notified of updates.

If there is a consistent theme in the comments I received from users of Zenith software, it is that they are not being told that an update is available, even when they are properly registered. Clearly, the software registration system is not working as well as it should.

Conclusions

Because of the impediments cast in its path, Zenith is unlikely to ever be able to update software as quickly and as often as some customers would like. As long as ZDS attempts to ensure that the software supports the hardware it has sold, and that the documentation meets company standards, there will always be a delay.

With better communication from ZDS, however, those delays could be made more bearable. △

ARE YOUR PERSONAL COMPUTERS ON SPEAKING TERMS?

Connect them with a Novell Local Area Network.

Novell sets the standard for high performance LANs with four complete LAN systems. Each one offers the reliability, security, and DOS compatibility of Novell's NetWare™ operating system.

Zeducorp offers the full Novell product line. Let us network your Zenith (or compatible) personal computers with the Novell Solution!

NOVELL

ZEDUCORP P.O. BOX 68 STIRLING, NEW JERSEY 07980 **(201) 755-2262**

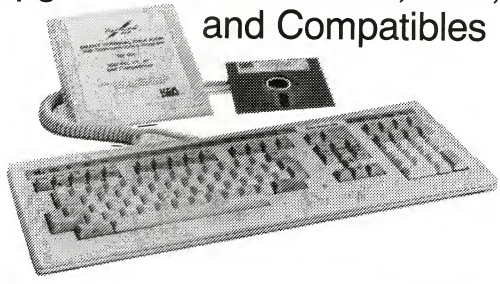
Your Authorized Novell Dealer.

NetWare is a trademark of Novell, Inc.

Circle #236 on Reader Service Card

PowerStation220™

A Complete VT220 Work Station Upgrade for Zenith PC's, AT's, and Compatibles



"You'll never know you are not on a true VT220 — unless you take advantage of our many extended features."

PowerStation™ 220 **$289**
VT220 style keyboard and ZSTEMpc™-VT220 emulation Software.

ZSTEMpc™-VT220 Emulator Emulation Software only. **$150**
All the features of ZSTEMpc-VT100 plus 8-bit mode, downloadable fonts, user defined keys, full national/multi-national modes. Extended macros/script language. True 132 columns on enhanced EGAs and on most standard EGA's using the EGAmate option. 43 line support on EGA's. Enhanced keyboard support.

EGAmate™ daughterboard option for 132 columns on most standard EGA adaptors. **$39**

ZSTEMpc™-4014 Emulator **$99**
Use with ZSTEMpc-VT100, VT220, or standalone. Interactive zoom and pan. Save/recall images from disk. Keypad, mouse, digitizer, printer, plotter, and TIFF support. 4100 color and line style color mapping. 640 x 400 and 640 x 480 on some adaptor/monitors.

ZSTEMpc™-VT100 Emulator **$99**
High performance COLOR VT100. True double high/wide, smooth scrolling. ISO and attribute mapped color. XMODEM and KERMIT, softkey/MACROS, DOS access.

KEA Systems Ltd.
#412 - 2150 West Broadway, Vancouver, B.C. Canada V6K 4L9
Support (604) 732-7411 **TELEX** 04-352848 VCR **FAX** (604) 732-0715
Order Desk (800) 663-8702 Toll Free
30 day money back guarantee MC/VISA

Circle #175 on Reader Service Card

The Z100's Fifth Birthday: Interviews and Overviews

One fathered the Z100. One brought it IBM compatibility. The rest are standing by with birthday presents.

William N. Locke

This issue of *Sextant* coincides with the fifth birthday of the H/Z100 series of computers. Without doubt, these machines have been leaders in both the hobby and business markets; today, they are still in use in thousands of applications.

I became an avid fan of the Z100 shortly after its initial release in 1982. The day after buying my Z100, I tried to figure out how to write directly to its video memory. Since the Z100 Technical Manual was not yet available, however, I eventually gave up. So, I put a note on the Heath Users' Group bulletin board on CompuServe asking for help. Dale Wilson answered with a short program in C, and told it all in about 15 lines. I've been using his information ever since.

I learned many other bits of information about the Z100 from the HUG bulletin board and from *Sextant*. The Z100 became a technically well known machine because of the attitude of sharing that exists among users.

In recognition of the superb design of these computers, I decided to interview Barry Watzman, one of the early Heath computer designers, and the one chiefly responsible for the Z100. I also interviewed Dave Cheung, president of UCI Corporation, a strong third-party supporter of the H/Z100 line of computers today.

An interview with the Z100's architect

Barry Watzman did the architectural design of the H/Z100 series computer, and he was the product manager of the H89 for some time. (As you can see from the very first question, I remain a fan of the Z100.)

Barry, how could you have designed such a superb computer as early as you did, and have that machine remain competitive for so many years?

The initial Z100 design was performed in 1979 in a proposed product-line plan that I prepared for Jay Jarrett [then in charge of project planning for Heath]. Bill Johnson [then vice president of Heath Company] also received a copy.

> ***"The Z100 would have done better if Zenith had supported it with more conviction."***

The Intel 8086 and 8088 microprocessors had just been introduced, as had the Zilog Z8000 and Motorola 68000. It seemed to me, at that time, that the 8086/8088 design was likely to be the dominant processor of the three. The eight-bit data bus used by the 8088 was substantially similar at the hardware level to the eight-bit 8085, making a dual-processor design relatively easy to implement.

When I started the design of the Z100, I chose to break with the past computers, and asked: "What would be the best combination of display, memory, and disk I/O?" The 8085 eight-bit processor was included to allow a bridge to existing CP/M software.

There was really no software available for the 16-bit 8086/8088 microprocessors at that time. I expected that the eight-bit side of the Z100 would be useful in the early part of the machine's life, but would become extra baggage towards the end of its life.

The 8085 was selected at that time—rather than the Zilog Z80—for speed, cost, and printed-circuit board space considerations. The 8085 ran at 5 megahertz, while the Z80 ran at only 4 MHz. In addition, the use of the Z80 would have required the use of additional circuitry on the main Z100 board. Aside from the fact that the space on the circuit board was not available, a small but significant amount would have been added to the final retail price.

During the early design life of the Z100, we planned on using 96-t.p.i. disk drives. I believe that the machine which we originally displayed at the National Computer Conference had these drives. At the last minute, we changed to 48-t.p.i. drives—resulting in 360K of disk storage rather than 720K. This choice was made for reliability, but it turned out to be very fortunate in that 48-t.p.i. drives were compatible with those used by IBM. This allowed the Z100 to be disk compatible with the IBM PC.

Why didn't you include an Intel 8087 math co-processor in the original design?

We considered that, but we didn't have the necessary room on the motherboard. And at that time the chip was extremely expensive. In addition, there was very little commercial software available that made use of the 8087. In fact, most software doesn't use the 8087 even today, although for some applications (such as CAD) it can be an important feature.

At the time that you designed this machine, did you ever expect it to wind up as an 8-MHz, 768K computer?

Certainly!

The original plan for adding memory was to use the S100 bus memory boards. You need to realize that the choice we

William N. Locke is a naval officer stationed in the Norfolk, Virginia, area. Bill's been interested in the Heath line of computers since 1982, and has been writing Sextant's *"Z100 Notebook" for over a year.*

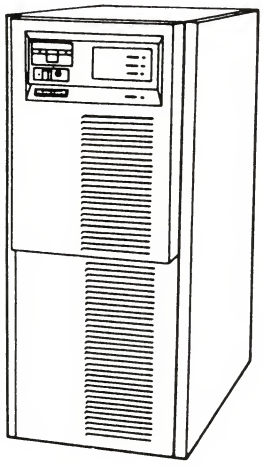
Now with Application Program Interface

HONEYWELL USERS

Connect Your Z-100 Series Or Z-100 PC Series Computer To Honeywell Host Systems

The ultimate micro-to-mainframe link

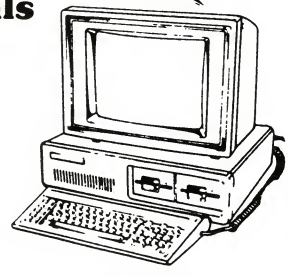
PC77/78 — Emulates the Honeywell VIP7700/VIP7800 series of synchronous terminals



Features:
• color attribute mapping • hot key to DOS • access host via multiple windows • print redirection • script processing • help facility • print spooling

File Transfer:
• menu driven • macro capability to bypass menus • data compression • file identification security features • attended and unattended mode of operation • restart capability • help facility

PC73/78 — Emulates the Honeywell VIP7200/VIP7300/ VIP7800 series of asynchronous terminals



Features:
• color attribute mapping • hot key to DOS • print redirection • script processing • help facility • print spooling

File Transfer:
• Kermit • Xmodem • ASCII • menu driven • macro capability to bypass menus • attended and unattended mode of operation

The personal computer can be connected to any Honeywell host via a modem, modem-bypass or multiple interface unit (MIU) and may reside on a communications line with other PC's or terminals. No host system or application software modification, regardless of the operating system is required.

High-performance communications software from:

Cambridge Computer Corporation
203/288-6004, Telex 6502236599

Honeywell is a trademark of Honeywell, Inc.

Circle #197 on Reader Service Card

Need Help?

H/Z Eight-Bit Computer Problems "Backing You Into a Dark Corner"?

The

SEBHC JOURNAL

Stands Ready to Provide All The HELP You Need ... *TODAY*! "How-2" tutorial articles in each issue, plus "oodles" more! *FREE* membership in the Society of Eight-Bit Heath Computerists with SEBHC JOURNAL subscription. 12 issues for only $15

Subscribe/Renew NOW!

SEBHC JOURNAL
895 Starwick Drive
Ann Arbor, MI 48105

Circle #138 on Reader Service Card

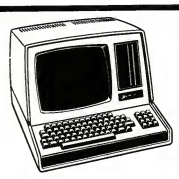
LACLEDE PRINTING COMPANY
10702 Manchester Road
St. Louis, Missouri 63122
(314) 821-3313

Reasonably-Priced
COMPUTER FORMS

- Checks, Invoices, Labels Letterheads, etc.
- Small Quantities and Up
- Prompt Free Delivery

Why not send us a sample and ask for a price?

Circle #100 on Reader Service Card



Quality '89

Enhancements, 8-bit Software Still Available.

MAGNet local area network connects Z89s, Z100s, and PCs!

MAGNOLIA MICROSYSTEMS

2818 Thorndyke Avenue West
Seattle, WA 98199
(206) 285-7266

Circle #134 on Reader Service Card

faced was not 64K chips vs. 256K chips, but rather 64K chips vs. 16K chips. Most machines at that time (including the IBM PC) were using 16K devices. 256K chips were as far in the future then as 4-megabit chips would be today.

Running at a faster clock speed (beyond 5 MHz) was in the plan from day one. Some of the components needed to do this with good reliability were not available at reasonable prices when the Z100 was initially announced.

However, I have no idea why it took Zenith so long to produce the machine with a standard 8-MHz clock speed. During development, we had a Z100 running at 11 MHz using CompuPro static memory boards. I believe that the first 8-MHz machines were not offered by Zenith until late 1984 or early 1985.

How do you feel the Z100 fared against the IBM PC?

Every technical evaluation that I have seen comparing the two machines found that the Z100 was the better machine. These evaluations resulted in the major contracts that the Z100 received—such as the ones with the military, and with Clarkson University.

I wanted to upgrade the Z100 to include more of the IBM ROM BIOS code in the Z-DOS IO.SYS module. I felt that too much emphasis was placed on the creation of the Z150-series computers. This was one of the reasons that I left Zenith back in June of 1983. Zenith Data Systems and Zenith management did not believe in the Z100. They chose to abandon the Z100 in favor of an IBM-compatible system, without doing all that was possible to make the Z100 as compatible as it could be.

The Z100 would have done better if Zenith had supported it with more conviction. In the end, however, the results would probably have been similar. IBM's influence on the market was far greater than anyone realized at the time, and I doubt that it could have been overcome, regardless of the technical merits of any competing system.

An interview with a Z100 product developer

Many independent developers have supported the Z100 since it was first offered, and they continue to support it. But one measure of a market's strength is that it continues to attract—and *keep*—new companies. The UCI Corporation offered their first Z100 product (a memory board) just about two years ago, and they continue to develop new products.

I recently interviewed Dave Cheung, UCI's president, at a computer show in Virginia Beach, Virginia. Dave had brought several Z100s and had them in a local-area network with IBM-PC compatibles. The Z100s were equipped with UCI's EasyPC PC emulator, the EasyRAM 2-megabyte RAM board, a 128-MB hard disk, and a tape-backup unit.

Dave, where did UCI Corporation come from? And how did you get into the business of supporting the Z100?

I have been involved in systems integration since 1979. In 1983, we established our company, United Computer Incorporated, and started doing circuit design using the S100 bus. During that period, we did the design of an I/O board and a single-board computer for the CP/M, MP/M, and TurboDOS operating systems.

By the first quarter of 1984, it became evident that the general S100 market was drawing to a close, and we chose to target our future products towards the Z100. This computer was popular, and it used an S100 bus for add-on architecture. We produced a 2-megabyte RAM board for the Z100, which became very popular.

There were several companies producing speed-up modifications for the Z100 at the time. Many of these modifications consisted of only a crystal and a switch. This caused a problem because the memory boards would not work with these modifications. Neither did the Zenith 256K board.

UCI decided to produce our own speed-up modification, and we did so. We were later accused of copying the competition. This was not the case at all. We solved a problem with bus timing that the others were unable to solve at the higher clock rate.

During the first quarter of 1984, we realized that an IBM-PC emulator was needed for the Z100. Three months later, we had a working prototype of the EasyPC. I showed this to the people at Zenith Data Systems. They were very impressed at the time. They said that we had been able to do [in three months] what their engineers had been unable to do in two years. Zenith made the EasyPC part of their product line, and it was first distributed during the last quarter of 1984 at CHUGCON in Washington, D.C.

The original EasyPC did not fully support the COM ports of the PC-compatible computers. This was solved with the introduction of the Easy I/O board in 1985. This board came in two varieties—one with one COM port, and the other with two COM ports, a game port, and a clock. The Z100 ports could not be made directly compatible with the IBM PC due to the interface hardware differences between the two machines.

The EasyRAM board, RAM-disk software, and EasyWIN add-on equipment are our most recent products. We have also been working with several local-area networks, and currently offer hardware to make the Z100 compatible with LAN Link, Vianet, and ARCNET.

UCI also offers an expansion and speed-up kit for the Z148 computer.

Where do you see the computer market going at this point?

The 80386 technology is at the door.

That microprocessor is powerful, and it will overcome the current PC and AT markets within the next six months.

I also expect that many companies will produce equipment for use with the new IBM Personal System/2.

What do you see in the future of UCI?

We have a commitment to continue to support our customers in the Z100 market as long as they remain out there. They have been good to us.

I'm certain that you will find something to design, Dave. Let me thank you for supporting the Z100 for so long.

What's next?

Dave Cheung and UCI are just one of the companies that have given us a continuous flow of new products for the H/Z100. UCI's products include the EasyPC, EasyRAM, EasyWIN, Easy-8087, a tape back-up system, and local-area network hardware. Several of these products have been developed over the past year. (I will be reviewing a few of these in a future "Z100 Notebook.") UCI certainly sees a future for the machine.

Several other companies share that perspective. I've reviewed a number of their products in the "Z100 Notebook," and I hope to review more in the future.

On the hardware side, a new business, Hughes Development Systems, has released a product that adds a fourth video memory plane, giving the H/Z100 an "Intensity" capability. Another feature allows remapping the colors of the Z100.

New software is also still being produced. The Software Group has a Z100 version of Enable. (This major integrated package is reviewed in the "Z100 Notebook" in this issue of *Sextant*.)

Zenith has provided a version of Microsoft Windows for the Z100. This will allow us to use software that will be produced for the Windows environment.

A new resident screen-printing program, ScreenPro, was released by Paul F. Herman, Inc. Workman and Associates has produced a version of their FTL Modula-2 for the H/Z100. Hogware has created the interlace-mode graphics editor, ShowOff. (For a review of ShowOff, see the "Z100 Notebook" in this issue.)

And there's a superb little program called SANDER, created by Cliff Bender of CB Sftwr. SANDER will quickly make a change in many files. Say you need to change the path for an `#include` file in a few hundred source-code modules; SANDER will perform the act in one line, saving the hours of labor you'd have to spend calling each file into an editor for update.

While I'm giving this (incomplete) list of products for the '100, I will even take the liberty of mentioning Graphpak, a graphics C library sold by The Software Toolworks. (I wrote Graphpak, so I won't be reviewing it.) This item is designed to give a user easy access to graphics on the Z100 or on an IBM compatible. You can even write graphics programs that will work on both machines. Graphpak supports Lattice, Computer Innovations version 2.3, DeSmet, and the Toolworks compilers. The Toolworks sells Graphpak for a song, complete with all source code and a graphics editor.

So, even though Heath/Zenith no longer manufactures the Z100, the machine is still the center of an active marketplace. (It makes no sense to trade one in for an IBM-PC clone. You'd wind up wishing that you had your H/Z100 back.)

As long as we support the people creating hardware and software for the H/Z100, they will support us. I fully expect to write a tenth-birthday article for the H/Z100 in these pages, using my H/Z100.

Additional Information

UCI Corporation
948 Cherry St.
Kent, OH 44240
216/673-5155, 800/UCI-COMP

Video Enhancement Board (V1), $139;
Monochrome Option (V1-M), $39.
Hughes Development Systems
10101 S.W. Freeway, Suite 400
Houston, TX 77074
713/772-2840

Enable, $195.
The Software Group
Northway Ten Executive Park
Ballston Lake, NY 12019
800/634-3470; in New York,
800/551-1004

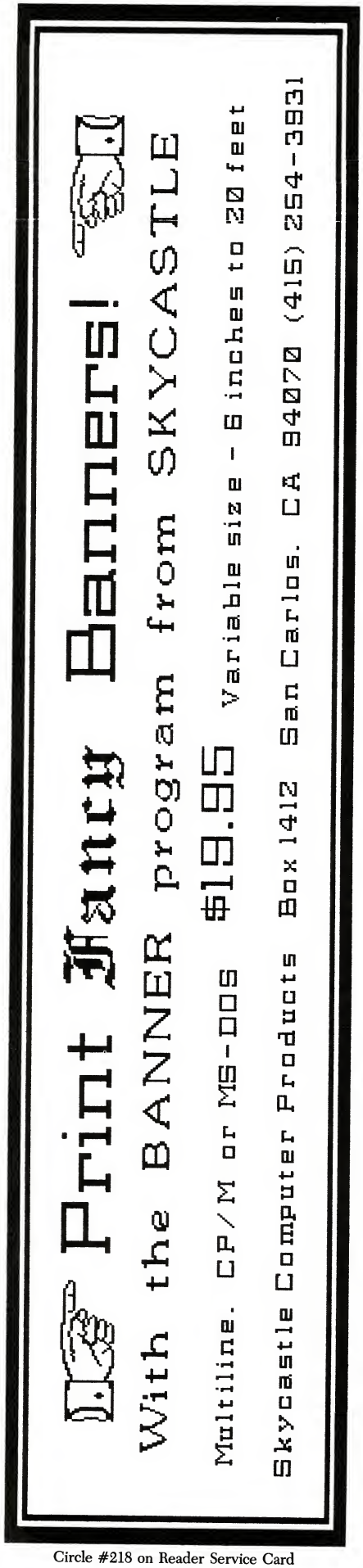
Microsoft Windows for Z100,
(MS-3063-30), $99.
Heath Company
Benton Harbor, MI 49022
Orders: 800/253-0570; in Michigan and Alaska, 616/982-3411

ScreenPro, $59.
Paul F. Herman, Inc.
3620 Amazon Drive
New Port Richey, FL 33553
813/376-5457

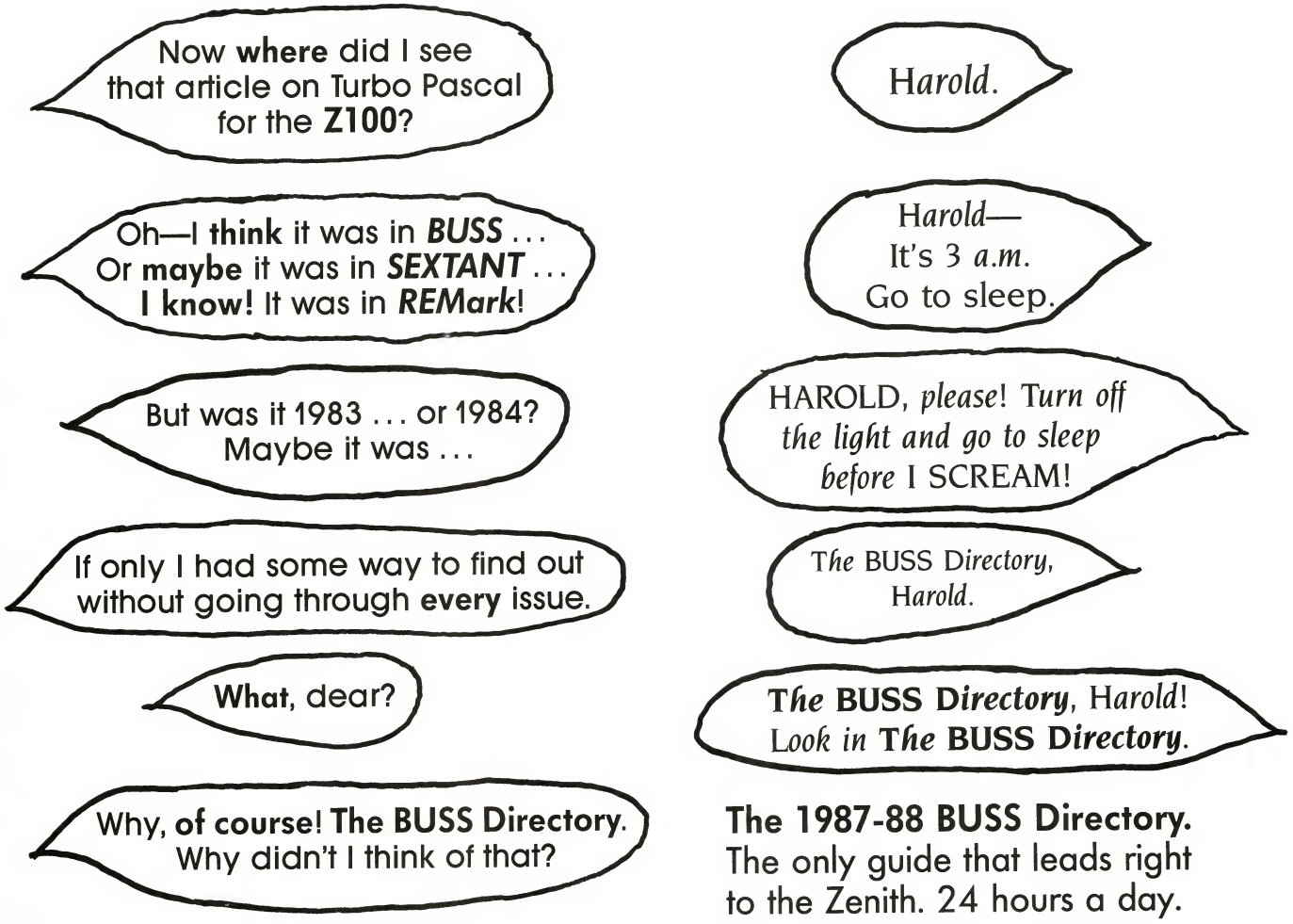
FTL Modula-2, $49.95.
Workman and Associates
1925 East Mountain St.
Pasadena, CA 91104-4016
818/791-7979

SANDER.COM, $29.95.
CB Sftwr
Highway 301, Box 279
Wade, NC 28395
919/485-8811

Graphpak, $29.95, plus $3.50 shipping and handling.
The Software Toolworks
13557 Ventura Boulevard
Sherman Oaks, CA 91423
818/907-6789


Print Many Banners!
With the BANNER program from SKYCASTLE
Multiline. CP/M or MS-DOS $19.95 Variable size - 6 inches to 20 feet
Skycastle Computer Products Box 1412 San Carlos. CA 94070 (415) 254-3931
Circle #218 on Reader Service Card

3:00 a.m.—the search begins


Now **where** did I see that article on Turbo Pascal for the **Z100**?
Oh—I **think** it was in ***BUSS*** . . . Or **maybe** it was in ***SEXTANT*** . . . **I know!** It was in ***REMark***!
But was it 1983 . . . or 1984? Maybe it was . . .
If only I had some way to find out without going through **every** issue.
What, dear?
Why, **of course! The BUSS Directory.** Why didn't I think of that?
Harold.
Harold— It's 3 *a.m.* Go to sleep.
HAROLD, *please*! *Turn off the light and go to sleep before* I SCREAM!
The BUSS *Directory, Harold.*
The* BUSS *Directory, *Harold*! *Look in* ***The* BUSS *Directory***.

The 1987-88 BUSS Directory.
The only guide that leads right to the Zenith. 24 hours a day.

3:01 a.m.—the search ends

Whether you're looking for a spelling checker or a check organizer; an article on increasing '150 disk space or an article on reducing '100 fan noise; a supplier of games or a supplier to business, you'll find it in *The Buss Directory.*

The Buss Directory is the only complete, up-to-date guide to products and services for your Heath/Zenith computer. Handy indexes to publications, suppliers, users' groups, and product classifications make the directory an indispensable tool for home or office. At only $12.50 a copy, it's the one computer reference guide you can't afford to do without.

More than 10,000 users are already enjoying the benefits *The Buss Directory* provides. Don't keep your computer at arm's length, when *The Buss Directory* is right at your fingertips.

Circle #107 on Reader Service Card

Don't keep me waiting! Rush me *The 1987-88 Buss Directory*!

Send me ___ directories @ $12.50 ea. = $_____

- O Check or money order enclosed. (Checks must be in U.S. dollars payable on a U.S. bank. Foreign orders add $2.50 shipping and handling.)
- O Charge my O Visa O MasterCard

Card # _____ Exp. date _____

Name _____

Address _____

_____

_____

Buss, 716 E Street SE, Washington, DC 20003

SUPER VALUE
SAVE 60%
GET PTP FOR ONLY $39!

Newline's highly acclaimed PROFESSIONAL TEXT PROCESSOR normally sells for $99.00. Until we run out of the Z-100 Z-DOS/MS-DOS or Z-100 CP/M-86 versions you can get PTP for only $39.00. PTP for the IBM-PC and compatibles is also available at this super discount price in limited quantities. We have reserved only 200 of the PC version for this special. So don't miss out!

PROFESSIONAL TEXT PROCESSOR is a full screen text editor. It uses the editing keys on the computer keyboard as well as the function keys. PTP is designed to be fast, easy to use, and efficient. Features include: On-screen bold, on-screen underline, horizontal scrolling (allows text up to 255 characters wide), paragraph fill and paragraph justification, built-in print utility configures to all printers, programmable macro keys, standard ASCII files for compatibility with other applications and programming languages, and much more.

Also available is an optional 45,000 + word spelling checker, PROFESSIONAL SPELLING CHECKER. PSC normally lists for $49.97, but if purchased with PTP you get the spelling checker for only $29.00 during this special offer.

SEE REVERSE FOR MORE SPECIALS!

Newline Software, P.O. Box 289, Tiverton, RI 02878 (401)624-3322

SEND YOUR ORDER TODAY!

Quan.	Description	Price	Shipping *	Total

PLEASE PRINT — CHECK HERE FOR FREE CATALOG ☐

NAME

COMPANY

STREET

CITY — STATE — ZIP CODE

CARD NUMBER — EXPIRATION DATE

SIGNATURE

NEWLINE SOFTWARE
P.O. BOX 289
TIVERTON, RI 02878
or call:
(401)624-3322
SX887
MasterCard & Visa Welcome

* FREE SHIPPING on all orders over $150.00. Orders for less than $150.00, add $4.00 per item for shipping and handling. C.O.D. add $2.30. Allow 3 weeks for personal checks.

SUPER VALUE
SAVE 60%
GET PTP FOR ONLY $39!

Newline's highly acclaimed PROFESSIONAL TEXT PROCESSOR normally sells for $99.00. Until we run out of the Z-100 Z-DOS/MS-DOS or Z-100 CP/M-86 versions you can get PTP for only $39.00. PTP for the IBM-PC and compatibles is also available at this super discount price in limited quantities. We have reserved only 200 of the PC version for this special. So don't miss out!

PROFESSIONAL TEXT PROCESSOR is a full screen text editor. It uses the editing keys on the computer keyboard as well as the function keys. PTP is designed to be fast, easy to use, and efficient. Features include: On-screen bold, on-screen underline, horizontal scrolling (allows text up to 255 characters wide), paragraph fill and paragraph justification, built-in print utility configures to all printers, programmable macro keys, standard ASCII files for compatibility with other applications and programming languages, and much more.

Also available is an optional 45,000 + word spelling checker, PROFESSIONAL SPELLING CHECKER. PSC normally lists for $49.97, but if purchased with PTP you get the spelling checker for only $29.00 during this special offer.

SEE REVERSE FOR MORE SPECIALS!

Newline Software, P.O. Box 289, Tiverton, RI 02878 (401)624-3322

SEND YOUR ORDER TODAY!

Quan.	Description	Price	Shipping *	Total

PLEASE PRINT — CHECK HERE FOR FREE CATALOG ☐

NAME

COMPANY

STREET

CITY — STATE — ZIP CODE

CARD NUMBER — EXPIRATION DATE

SIGNATURE

NEWLINE SOFTWARE
P.O. BOX 289
TIVERTON, RI 02878
or call:
(401)624-3322
SX887
MasterCard & Visa Welcome

* FREE SHIPPING on all orders over $150.00. Orders for less than $150.00, add $4.00 per item for shipping and handling. C.O.D. add $2.30. Allow 3 weeks for personal checks.

FREE CATALOG

NEWLINE SOFTWARE specializes in a wide variety of hardware and software for the IBM-PC and compatible computers. Our catalog lists hundreds of products.

SEND FOR YOUR COPY OF OUR CATALOG TODAY !

THIS MONTH'S SPECIALS

HP Laser Jet Series II $ 1999.00
Ventura Publisher $ 529.00
MicroSoft **QuickBASIC $ 69.00**
Symantec **Q & A** Database **$ 249.00**
WordTech Systems **dBXL $ 109.00**
Ashton-Tate **Rapid File $ 272.00**
Paperback Software **VP-Planner $ 69.00**
Norton Utilities Advanced Edition $ 99.00
Peter Norton **Norton Utilities 4.0 $ 69.00**
Softlogic Solutions **Disk Optimizer $ 42.00**
Softlogic Solutions **Double DOS $ 36.00**
Softlogic Solutions **Software Carousel $ 42.00**
DAC Easy Accounting $ 53.00
Borland **Sidekick** (unprotected) **$ 59.00**
Software Publishing **First Choice $ 129.00**
Borland **Turbo Pascal (8087+BCD) $ 69.00**
Computer Associates **Supercalc 4 $ 329.00**
Fifth Generation **Fastback $ 119.00**
Funk Software **Sideways $ 49.00**
Meca **Managing Your Money $ 139.00**
Meca **Managing the Market $ 99.00**
Micrografix Inc. **PC-Draw $ 259.00**
Microrim **R:Base 5000 $ 309.00**
Microrim **R:Base System V $ 459.00**
MicroSoft **Flight Simulator $ 39.00**
Software Publishing
Harvard Professional Publisher $ 479.00
Harvard Project Manager $ 249.00
PFS:Professional File $ 169.00
PFS:Professional Write $ 139.00
PFS:Professional Plan $ 159.00
True Basic **True Basic 2.0 $ 99.00**
Word Perfect Corp. **Word Perfect $ 253.00**
Peter Norton **Norton Commander $ 55.00**
Monogram **Dollars & Sense $ 119.00**
Paul Mace Software **Mace Utilities $ 69.00**
Personics **Smart Notes $ 59.00**
Summit Software **Better BASIC $ 139.00**
Better BASIC Runtime $ 169.00

FREE CATALOG

NEWLINE SOFTWARE specializes in a wide variety of hardware and software for the IBM-PC and compatible computers. Our catalog lists hundreds of products.

SEND FOR YOUR COPY OF OUR CATALOG TODAY !

THIS MONTH'S SPECIALS

HP Laser Jet Series II $ 1999.00
Ventura Publisher $ 529.00
MicroSoft **QuickBASIC $ 69.00**
Symantec **Q & A** Database **$ 249.00**
WordTech Systems **dBXL $ 109.00**
Ashton-Tate **Rapid File $ 272.00**
Paperback Software **VP-Planner $ 69.00**
Norton Utilities Advanced Edition $ 99.00
Peter Norton **Norton Utilities 4.0 $ 69.00**
Softlogic Solutions **Disk Optimizer $ 42.00**
Softlogic Solutions **Double DOS $ 36.00**
Softlogic Solutions **Software Carousel $ 42.00**
DAC Easy Accounting $ 53.00
Borland **Sidekick** (unprotected) **$ 59.00**
Software Publishing **First Choice $ 129.00**
Borland **Turbo Pascal (8087+BCD) $ 69.00**
Computer Associates **Supercalc 4 $ 329.00**
Fifth Generation **Fastback $ 119.00**
Funk Software **Sideways $ 49.00**
Meca **Managing Your Money $ 139.00**
Meca **Managing the Market $ 99.00**
Micrografix Inc. **PC-Draw $ 259.00**
Microrim **R:Base 5000 $ 309.00**
Microrim **R:Base System V $ 459.00**
MicroSoft **Flight Simulator $ 39.00**
Software Publishing
Harvard Professional Publisher $ 479.00
Harvard Project Manager $ 249.00
PFS:Professional File $ 169.00
PFS:Professional Write $ 139.00
PFS:Professional Plan $ 159.00
True Basic **True Basic 2.0 $ 99.00**
Word Perfect Corp. **Word Perfect $ 253.00**
Peter Norton **Norton Commander $ 55.00**
Monogram **Dollars & Sense $ 119.00**
Paul Mace Software **Mace Utilities $ 69.00**
Personics **Smart Notes $ 59.00**
Summit Software **Better BASIC $ 139.00**
Better BASIC Runtime $ 169.00

The Z248: One User's Impressions

Meet Zenith's 8-MHz 80286 computer.

Kirt Alan Winter

The Z248—Zenith's latest entry in the IBM-PC-AT clone wars—is another example of the quality that has moved Zenith into the front lines of the conflict. Like the Z241, the Z248 has been built with fast components throughout. There's no need for wait-states to allow the 80286 central processing unit (CPU) to accommodate slower chips during memory access. And the throttle has been turned up a couple of notches, from the '241's 6 megahertz to a quicker 8 MHz.

The '248 comes standard with 512 kilobytes of memory and a 1.2-megabyte 5¼" floppy drive. You can add another floppy drive (either 1.2-megabyte or 360-kilobyte) and up to two hard-disk drives. My particular model (ZW-248-82) came with a 20-MB hard disk and an Enhanced Graphics Adapter (EGA) card. You can also purchase the standard unit (one floppy), or one with a 40-MB hard disk (ZW-248-84).

The software that came with my machine included version 3.1 of the Microsoft Disk Operating System (MS-DOS). In hard-disk models, Zenith will throw in a free copy of Microsoft Windows (discussed below).

The '248 has a detached keyboard nearly identical to that of the H/Z150-160 series. It has a fairly good feel, but keyboards are truly a matter of taste. I would prefer one that more closely resembles the Z100's, both in the shapes of the individual keys and in the layout (except for the cursor-key arrangement). Failing that, the keys could be a bit firmer. Still, having a detached keyboard is convenient, and the '248's is certainly adequate for my needs.

The system unit is quite a bit larger than that of the H/Z150. That extra space gives ample room for installation of hard drives. (There's enough room for two full-height units.) They are to be installed underneath the floppies, which sit beside each other.

As with the H/Z150, there is no actual "motherboard" to hold most of the main system components. Rather, the '248 is a "backplane," or "bus-based," device; so, there is one circuit board whose job is simply to provide connectors into which all other boards are plugged. The main system boards are inserted in Zenith-designed 128-pin connectors. There is one such slot with no board installed.

In addition to that slot, there are two conventional IBM-PC-type (64-pin) expansion connectors, and four AT-type (96-pin) connectors.

I measure the value of a machine by how much more convenient it makes my work.

There are three main boards: a combined floppy- and hard-disk controller; a serial and parallel input/output board; and the CPU board, which includes a socket for an 80287 math co-processor. (As with the one on the AT, this 80287 runs 33% slower than the 80286 CPU that powers the system.) The system board also holds 512K of 120-nanosecond RAM, and is fully populated.

The backplane also contains a battery holder. This battery maintains power to the clock/calendar, and helps the system remember its configuration. (I found there's a danger that this battery can be shaken loose if the Z248 is stood on end to conserve desk space.)

Nestled toward the front of my machine, on the bottom of the cabinet, is a Miniscribe 3½" hard drive. Despite making a loud chirping noise, the hard disk does its job well.

In my system, one of the IBM-PC-type expansion slots was filled with an EGA card. Depending on which graphics mode a given program requests, Zenith's card will automatically switch among EGA, Color Graphics Adapter (CGA), and Monochrome Display Adapter (MDA) operation. This capability is complemented on my system by a ZVM-1380C color monitor, which automatically adjusts to the frequency of a CGA or EGA card.

EGA-display switching is very useful, and the text modes are much improved over CGA-type displays. Even the Z100's well-regarded video is a big step down.

In the tradition of Heath/Zenith machines, an excellent monitor program is stored in ROM, accessible by pressing the Ctrl, Alt, and Ins keys simultaneously. One feature, the SETUP command, makes it easy for you to tell the machine the number and type of disk drives that are connected.

The ROM routines include test utilities, and a debugger that allows you to view the contents of memory addresses, change the values stored in CPU memory registers, and use other traditional debugging aids.

The software support

My '248 came with MS-DOS 3.1 already installed on the hard disk. The documentation came in three separate boxes, two for MS-DOS and one for Windows. (Here, I felt, Zenith's famous quality had slipped slightly: while the MS-DOS documentation is well written and thorough, it is contained in paper-covered, plastic ring binders that I detest. Insertion of changes is difficult, and I find that the pages are hard to turn without tearing.)

The MS-DOS documentation comes in four volumes. Volumes I, II, and III are the basic "reference set"; a fourth volume, titled Conversational MS-DOS, is intended as a beginner's tutorial to the operating system.

The Windows documentation is a bound paperback book with roughly 300

Kirt Alan Winter is a graduate student in computer science at Oregon State University. He's interested in artificial intelligence, basketball, and history, although not necessarily in that order.

pages of information. Most of the information relates to Windows on any machine, but there are both IBM-compatible sections and Z100 sections. The book has two parts; the first simply serves to familiarize you with how to work in the Windows environment. The second is a reference to the special Windows applications—notepad, clock, calendar, calculator, etc.

For those of you not familiar with it, Windows is intended to provide a standard graphics interface, and to allow switching among various applications as if they were all part of one integrated package. (To *share* the screen, however, programs have to be Windows compatible.)

Windows provides a user interface that resembles the Apple Macintosh environment. Windows is not a Macintosh clone, however, and its way of handling applications and windows themselves is different. Both the Macintosh and Windows do have the advantage (at least for new users) of being graphically oriented, and thus easy to learn.

Zenith's version of Windows is very much the same as Microsoft's, with two differences. First, Zenith's version contains a startup screen with copyright information and comments relevant to government contracts. Second, Zenith sells the applications Write and Paint for $49; these were included free in a friend's Microsoft-packaged version (priced roughly the same as Zenith's).

360K vs. 1.2-MB drives

According to the MS-DOS manual, you cannot reliably share disks between two drive types. So, because I was still using my '100, I was initially concerned that I had only a 1.2-MB floppy drive on my '248, and a 360K drive on my '100.

The heart of the problem is that the 360K drive's magnetic head is twice as wide as that of the 1.2-MB drive. Therefore, a 360K disk track cannot be totally overwritten by the 1.2-MB drive.

However, this problem does not appear to be as serious as the manual would lead you to believe. I have successfully transferred data back and forth between my H100 and Z248, and have read and written repeatedly on disks in both machines. I have yet to experience any problems doing this.

Speed

I've never been a big believer in benchmarks. For me, the value of a new machine has always been measured by how much more convenient it makes my work. The speed of the '248 is most noticeable in the scrolling of the screen under Microsoft Word 3.1. The Z100 version and the old version 1 on my H150 were almost exasperatingly slow.

I also use Turbo Pascal and Microsoft C quite frequently, and the performances of both are much improved. With the C compiler, though, this is partly due to the fact that disk accesses are much faster with the hard disk than they are with a floppy.

However, for those of you who enjoy looking at benchmarks, I will provide one for you.

The benchmark is a "travelling-salesman" program that I wrote using Microsoft C. This program is given a number of cities and a starting point; it then uses recursion to generate all the possible sequences in which the cities can be visited. See Table 1 for the results of this benchmark.

Microsoft C has compile options that allow the generation of 80286 code, so I compiled and ran the program both for standard IBM-PC operation and for AT-compatible operation. Measured against a Z100 with UCI's EasyPC installed, the Z248 is about four times as fast as either the IBM or Z100 mode.

Memory

My biggest complaint about the '248 is that the CPU board can take no more than 512K of memory. It would have been much better to have provided for expansion to 640K on the main board.

As it is now, if you want that extra 128K of memory, you have to buy a Z445 memory board. This includes 512K of memory, giving 128K to base memory and the remaining 384K to extended memory. (Currently, this is primarily useful as a RAM disk.) But the price of $349 seems a bit much if you need only that extra 128K.

For those of you not familiar with AT-type memory addressing, it works something like this. From the beginning of memory to the 1-megabyte line, the map is based on that of the IBM PC. The first 640K is user memory, while the upper 384K is reserved by the system for ROM and display memory. Anything above this is called extended memory and is not directly used by MS-DOS at the present time.

Value

Overall, I feel that I made the right choice in an AT compatible.

If you find that the speed of your Z100 or Z150 is getting to be a noticeable bottleneck, then perhaps the '248 is a good choice for you too. In my opinion, it offers the best value in an AT compatible.

Should You Buy a '248?

The first and most obvious advantage of the H/Z248 is speed. Your MS-DOS software will run considerably faster on it than on a Z100 or an IBM-PC compatible.

But is the purchase price worth it?

Whether you need a '248 depends on whether you are doing time-consuming work, such as sorting in a data base, or lots of calculations in a spreadsheet. Other areas that are CPU-speed intensive are program compilation, computer-aided design, and desktop publishing.

If you find yourself staring at the screen a lot while the computer chugs along, then a '248 should increase your efficiency.

Price, of course, is the bottom line for many of us. We're talking about something on the order of an extra $1,500 over the price of a '158, Heath/Zenith's 4.77/8-MHz IBM-PC compatible.

If we assume comparable hard disks in both machines, a '248 would cost somewhere around $3,000 less than the 80386-based Z386, the fastest Heath/Zenith computer.

	Z100 standard	Z100 with EasyPC	Z248 (8086 code)	Z248 (80286 code)
8 cities	3.9	3.7	1.0	1.0
9 cities	33.5	32.1	8.7	8.5
10 cities	322.4	309.6	83.4	80.8

Table 1. Benchmark results for the author's "Travelling Salesman" program, written in Microsoft C. The program is given a number of cities and a city to start from; it then uses recursion to generate all the possible sequences in which the cities can be visited. (Times are given in seconds; both machines are running at 8 MHz in all modes.)

Ordering Information

H/Z248, $2,999.
Z445 memory board, $349.
Heath Company
Benton Harbor, MI 49022
Orders: 800/253-0570; in Michigan and Alaska, 616/982-3411 △

S & K Technology, Inc.
Quality Software for Heath/Zenith Microcomputers

Announcing PC WatchWord® Version 3

New features:

- **Mail merge and automatic indexing**
- **DOS command execution with screen capture**
- **User defined display fonts (EGA only)**
- **Proportional font support for the HP LaserJet**
- **Arithmetic with user-settable precision and base**
- **Expanded manual loaded with new commands**

Plus all of the features of WatchWord Version 2 including formatting, centering, macros, horizontal scrolling on long lines, large file capability, split screen, color, and an extensive configuration facility.

PC WatchWord	**$129.95**	**PC Resident Speller™**	
PC WatchWord Demo Disk	**$2.00**	**(includes STRIKE™)**	**$99.95**
Resident Speller Demo Disk	**$2.00**	**STRIKE**	**$49.95**

SPECIAL OFFER: PC WatchWord - PC Resident Speller Combination $199.95

Texas Residents add state sales tax.

S & K Technology, Inc., 4610 Spotted Oak Woods, San Antonio, TX 78249, (512) 492-3384

Circle #230 on Reader Service Card

Increase Zenith PC Speed 600%...Memory 2MB

286 Speedcard
- 100% IBM compatible
- Keyboard switching only
- 3 year parts/labor warranty
- 30 day risk free trial

Suggested retail $459.00
Only $389.95
(Special Introductory Price)

286 Ramracer
- Same features of Speedcard Plus
- Up to 2MB of RAM
- Free print spooler
- Free RAM disk
- EMS and EEMS compatible
- 2 year parts/labor warranty

Suggested retail $745.00
Only $595.00 (Basic)
(Special Introductory Price)

ALPHA SERVICES
229 Gerloff Road
Schwenksville, PA, 19473
215-287-9006

Dealer Inquiries Welcome

IBM is a trademark of International Business Machines Corp. 286 Speedcard is a trademark of Micro 1. 286 Ramracer is a trademark of PC Technologies

Circle #127 on Reader Service Card

***** LOW LOW PRICES *****
CALL TO ORDER

HARD DRIVES FOR ZENITH PC/XT

Seagate 20MB w/WD ctr.	$399
Seagate 30MB w/WD ctr.	$499
Seagate 40MB w/WD ctr.	$699

HARD DRIVES FOR AT

Seagate 1/2ht 20MB	$359
Seagate 1/2ht 40MB	$569
Seagate f/ht 30MB HS	$669
Seagate f/ht 40MB HS	$759

PRINTERS

Epson FX85e $449 FX286e $600
Call for other Models

MATH CO-PROCESSORS

8087-5 $159 8087-8 $199
80287-8 $339 80287-10 $395

IBM COMPATIBLE XT/AT's

XT from $899 AT from $1,370

ZENITH 159-2 from $1,359

OMNI DATA SYSTEMS, INC.
4 Glendale Road
Attleboro, MA 02703
(617) 222-0425

Circle #201 on Reader Service Card

The Eight-Bit World

Walter J. Janowski

You, too, can own a Rembrandt

From the vendor mailbag

New software for HDOS 3?

Kudos to S & K Technology

One last note

Looking ahead

You, too, can own a Rembrandt

You say there's nothing new in CP/M software? You say you have to get an IBM clone because you can't print graphs from your spreadsheet data? *You say the H19 terminal can't do graphics?*

Think again!

Spectre Technologies, Inc., has just released Rembrandt, their business-graphics toolkit, for the H89/H19. Strictly speaking, Rembrandt is not a new product, since it has been available for the Kaypro and Osborne computers for some time; but a new version was developed specifically for the graphics capabilities of the H89 computer and H19 terminal.

Not only that, but the '89 version coincides with a price cut! Rembrandt now costs $39.95, down from $79.95.

Rembrandt comes pre-installed and ready to run, and is available in both hard- and soft-sectored formats for CP/M. It runs without problem with a standard-issue H19/89, using the block-graphics characters that can replace the lowercase characters.

One small discrepancy is that the H19's graphics-character set lacks one block-graphics character available to the Osborne and Kaypro. Instead, Rembrandt uses the '19's diagonal-line character. (See Figure 1.)

Even this small point may be irrelevant if you've added an improved read-only memory (ROM) chip from Technical Micro Systems, Inc., or from GraphNet Systems (formerly Extended Technology Systems). Both GraphNet's Super19 or Font19 character-generator ROM (which are no longer being actively marketed) and TMSI's SuperSet ROM include the missing character, and Rembrandt can be configured to recognize the presence of these modifications and take advantage of them.

(The Z100's character set also includes the missing graphics character, and Rembrandt will run on the CP/M side of a Z100.)

If you have TMSI's SuperSet, Rembrandt will allow you four levels of shading when creating bar graphs, as opposed to the standard two.

Unfortunately, Rembrandt will not work properly if you have installed NORCOM's G-Prom. You will need to either switch to another character-generator ROM or forget about Rembrandt.

Draw pictures

Rembrandt itself is divided into three main programs. The first, BOARD, is a full-screen graphics editor, not unlike the Ed-A-Sketch program from The Software Toolworks.

BOARD allows you to create graphics pictures using the H19/89's graphics characters individually; it also provides special commands that cleverly use the graphics-character set to create circles, boxes, lines, and even large alphanumeric characters. Standard keyboard characters may also be combined with the graphics.

Your completed graphics pictures may be saved to and retrieved from disk, as well as printed on a graphics-compatible printer such as the Epson series.

BOARD's command structure is well laid out, with help screens available. My only criticism is in the way that individual graphics characters are accessed.

The numbers 0 through 9 on the keyboard can be defined to display any of the graphics characters. (Note that those are not the numeric-keypad numbers; the keypad arrows are used for cursor movement.) When requested, the key definitions are displayed on the screen for reference.

However, using just the number keys means that only ten characters from the graphics set are available at any given time. A sophisticated creation requires repeated key redefinition to utilize the characters not currently represented. I

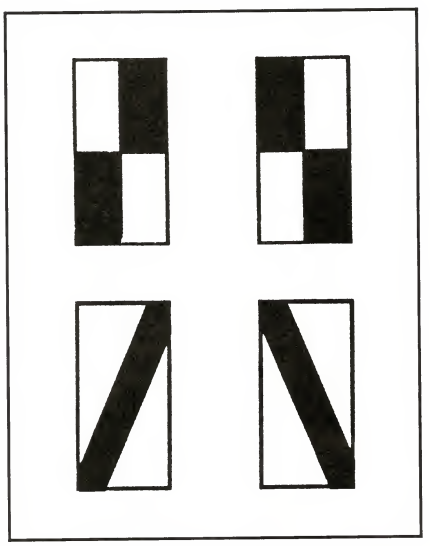
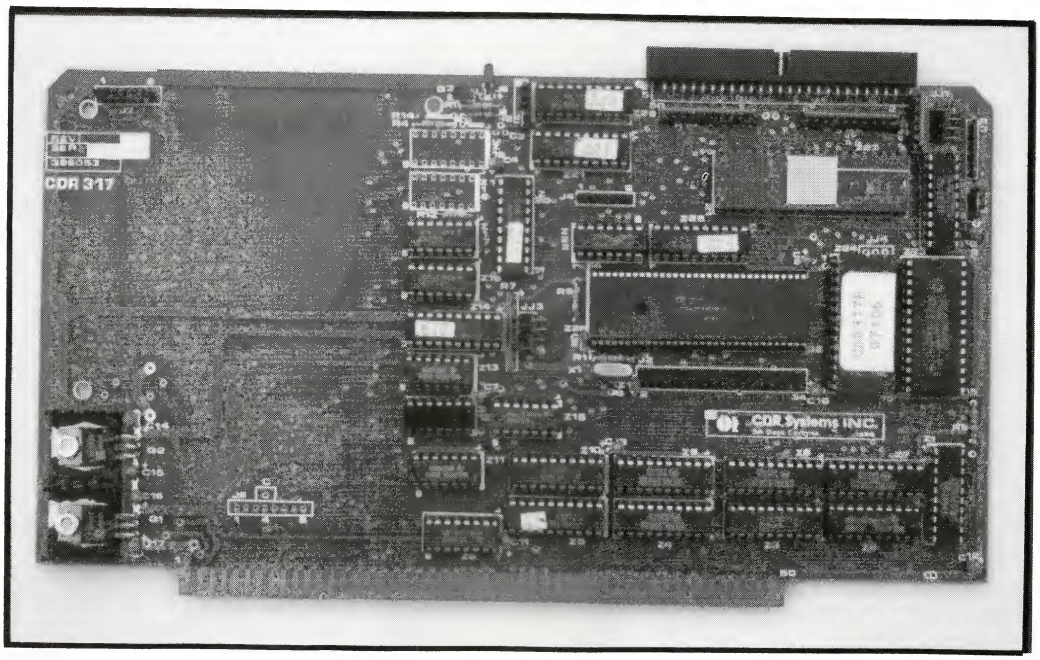


Figure 1. The graphics-character set of the stock H/Z89 computer and H/Z19 terminal lacks the character at the top—shown as it would appear in both regular and reverse-video modes. Rembrandt, a business-graphics software package from Spectre Technologies, employs the two characters shown underneath as substitutes.

A HARD DISK CONTROLLER PACKAGE THAT GOES BEYOND JUST ANOTHER CONTROLLER

THE ULTIMATE MASS STORAGE INTERFACE FOR THE ZENITH Z100 COMPUTER . . .



* SCSI (Small Computer Systems Interface) based mass storage controller for Winchester Drives and more.
* WORKS with any version of memory upgrade.
* WORKS at any Z100 speed (5 through 8 Mhz).
* WORKS with all versions of MSDOS, ZDOS, CP/M85, CPM86, and MP/M that handle the Zenith Z217 Winchester controller.
* WORKS with both the GEMINI and UCI emulation boards, plus all versions of ZPC 2 boards.

The CDR317 Intelligent Interface Board (CDR317-IIB) is an SCSI Host Adaptor that looks exactly like the Zenith Z217 Hard Disk controller to the H/Z110 or H/Z120 computer. It communicates directly to SCSI built-in drives like the SEAGATE ST225N drive for the cleanest and most cost effective hard drive add-on in the Z100 market. Up to 4 SCSI built-in drives can be used off of the controller on the 50 pin SCSI cable with the standard Zenith software. The CDR317-IIB can physically handle 15 SCSI devices.

The CDR317-IIB can also interface with the OMTI 3100 or XEBEC 1410A controllers to use standard ST506/412 compatible drives and SYQUEST cartridge removable drives. Each controller can use two drives. The CDR317-IIB can handle two OMTI or XEBEC controllers through the standard Zenith software, which has a maximum of 4 drives and a limitation of 64 megabytes for each drive. For the two board set, ask for the CDR317 PACKAGE. It contains the CDR317-IIB, ST506/412 controller, cables, and bracket for internal mounting.

With the CDR317, the Z100 can use current mass storage devices as well as the peripherals to come. We are committed to adding SCSI based peripherals: CD ROMS, the new 5.25" Bernoulli Box, the new Kodak Cartridge drive, small scale SCSI based (fast) networking, etc... to the CDR317 capabilities. Thus providing the most powerful mass storage interface available for the Z100 computer.

Ask about our other Z100, and H/Z89-90 products and about the Kodak SCSI cartridge drive package for the IBM-PC compatibles.

Call for current pricing, information, and for the name of a certified dealer near you.

Controlled Data Recording Systems Inc.
7210 Clairemont Mesa Blvd.
San Diego, Ca. 92111 Phone (619) 560-1272

H/Z89-90, Z100, H/Z110, H/Z120, Z217, Z100 are trade marks of Heath Company and Zenith Electronics Co., GEMINI a trade mark of Gemini Technology Corp, UCI a trade mark of UCI Corporation, MSDOS, ZDOS, CP/M85, CPM86, MP/M trade marks of Microsoft and Digital Research.

Circle #108 on Reader Service Card

think that a simpler implementation would be to shift the keyboard into its graphics mode and let the keys assume the same graphics characters they normally can.

Nonetheless, I don't think that I would use BOARD for much more than the occasional burning desire to create art on my computer. Perhaps more practically, it might be used to help design a playing board for a game.

Rembrandt's other sections are what display its true power.

Create charts and graphs

GRAPH allows you to create vertical and horizontal bar charts, pie charts, and x-y plots on the screen; if you wish, they can be sent to the printer. Figure 2 shows a sample bar chart.

The display of the bar charts is quite impressive. The x-y plots are of acceptable quality, but the pie charts fare rather poorly. The operating manual concedes this flaw, due in part to the "missing character" previously mentioned.

Although I am running a stock H89 character ROM and cannot speak firsthand, Spectre Technologies implies that you'll get more acceptable performance if you are using one of the recommended replacement ROMs.

Two sets of files are necessary to create a graph. The FORMAT file is created by the user and gives the title and subtitle to be displayed, as well as any labels used in the final graph. The DATA file contains the actual data values from which the graph is computed. The manual gives instructions on creating the data file from scratch, as well as utilizing data from BASIC programs, dBASE II, and SuperCalc files.

Create self-running presentations

The final section, BRIEF, allows you to use the pictures and graphs created with BOARD and GRAPH to create a self-running, almost animated, presentation. The program will display your selected screens sequentially with user-defined time delays.

You can also select one of several options to use for the transition from one screen to the next. You can wipe from top to bottom or from left to right, open and close "curtains" across the screen, fade, spiral, or fade through stripes. If you're familiar with some of the effects created by the graphics generators used by TV stations, you should get the idea.

BRIEF would be ideal for an automated business presentation, or a self-cycling demonstration program for display purposes. The sophistication of your presentation is limited only by your own creativity.

Documentation

Rembrandt's documentation is very thorough, well written, and easy to understand, although it was obviously written for the Kaypro/Osborne versions. There is a six-page addendum for the Heath/Zenith version. However, the differences are minor enough that they shouldn't cause any major problems as you progress through the manual.

The manual itself is professionally printed and bound in the now-standard, small, three-ring, loose-leaf binder popularized by IBM.

Each section contains a short "For the Impatient User" section, which allows you to fire up the program and see what it does before you devote the time to thoroughly studying the manual. I know that I tend to try new software first and read the documentation later, and I found it pleasant to discover documentation that catered to my impatient urge to *see the darn thing run* before I did anything else.

All in all, Rembrandt is both a useful business tool and a lot of fun. The price of $39.95 is extremely reasonable. I recommend you purchase a copy, both as a valuable utility to have, and to encourage companies like Spectre Technologies to continue to develop useful and reasonably priced software for our machines.

From the vendor mailbag

Here's an update on those vendors who offer products for eight-bit machines:

NORCOM is still providing replacement character-generator ROMs for the H89 and H19 terminals. G-Prom provides an enhanced graphics-character set, T-Prom enhances the text characters, and GT-Prom combines the features of both. G-Prom and T-Prom are $19.95 each, while GT-Prom is $24.95.

For the church that has an H89 or Z100, Larry Monk's Church-Related Computer Programming provides small-church software packages for expense accounting, contribution accounting, and membership records, with prices starting at $40.

FBE Research Company, Inc., still markets several add-on boards for the H/Z89, including a RAM-disk/print spooler. Their Slot4 bus expander adds one extra expansion slot to the '89, and they've got a parallel-interface card suitable for driving Centronics-compatible parallel printers.

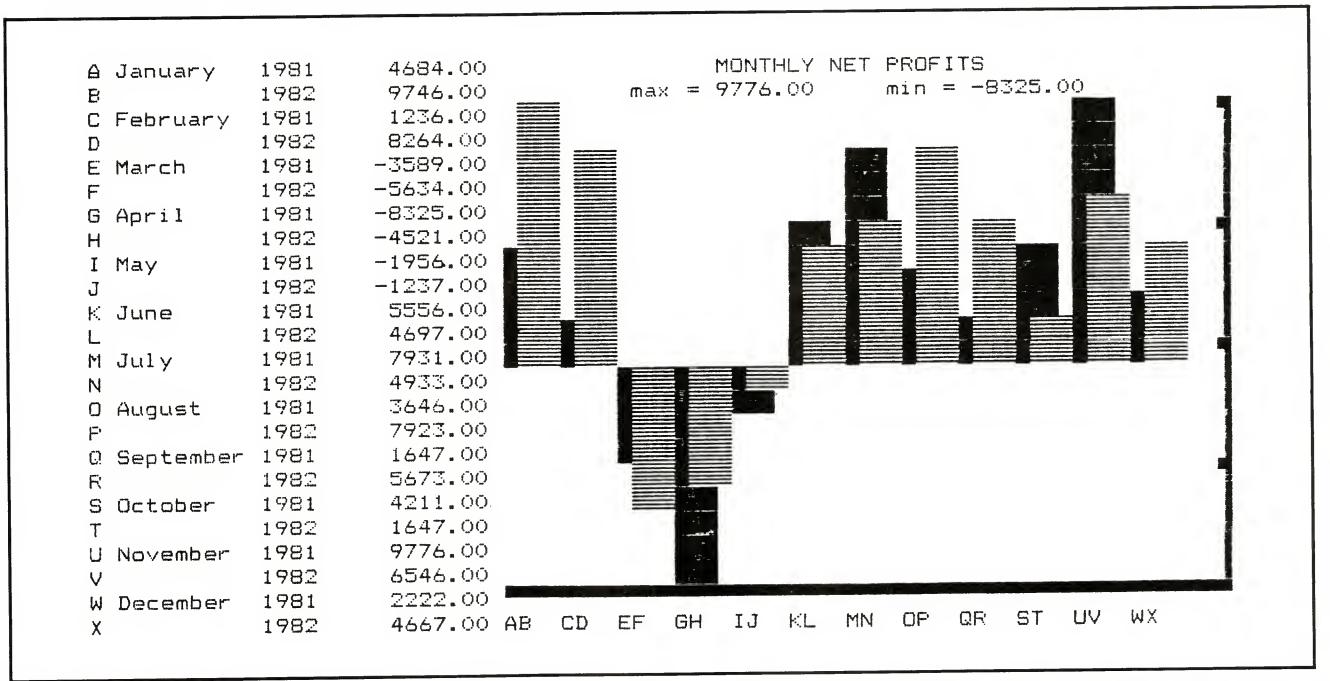


Figure 2. Rembrandt's GRAPH program allows you to create horizontal bar charts, vertical bar charts (as shown above), pie charts, and x-y plots on an '89.

New software for HDOS 3?

Now that the hoopla of the release of HDOS 3 has died down, it's time to think about possible new software to go along with it. I thought I'd just throw out a few suggestions and see if any of you hard-core programmers out there would take up the challenge.

One CP/M utility I'd dearly love to see for HDOS would be a file-management package like VFILER or NSWEEP. Seems to me somebody ought to be able to come up with one for HDOS.

There are quite a few public domain packages out there with source code written in C. Since C is known for its portability, and The Software Toolworks' powerful C/80 compiler and HUG's Small-C are both available for HDOS, it shouldn't be too hard to port over some of these C programs and modify them to run properly under HDOS.

And for that matter, don't forget we're still using the same CPU under CP/M and HDOS. Some of you dedicated assembly language programmers ought to be able to patch some 8080 or Z80 code from CP/M over to HDOS.

It doesn't have to be an exciting, new, earth-shattering software breakthrough. Let's take it as a challenge to see how much of our favorite CP/M software can be made to run under HDOS 3. I invite readers to contact me with their success (or failure) stories.

Kudos to S & K Technology

Way back in my first column (issue #21, March-April 1986), I suggested that vendors that no longer sell or support their eight-bit software products release them into the public domain. After all, so long as the company is no longer making money on the product and is no longer interested in taking the time to support it anyway, why not hand it out and let people take their chances?

Now, I'd probably prefer that vendors keep their products active. Vendor support, upgrades, etc., are all important. They keep the market healthy. But I realize that it may not always be practical for a vendor to keep a product in its active line.

Well, congratulations to S & K Technology, which has released its EDIT19 word processing package for HDOS into the public domain. (See *Buss* #135, March 3, 1987.) The package, including the software itself, a tutorial, and documentation, is available on disk from the CHUG library.

Let me extend a big thank you to Steve and Kay Robbins at S & K, and I hope this starts a trend for further releases from other vendors in the near future.

One last note

It's interesting to note that when the U.S. government imposed trade sanctions on 16-bit laptop computers imported from Japan, Zenith's Z181 was unaffected—its 80C88 processor was classified as an eight-bit device!

Looking ahead

As ever, my mailbox keeps filling up fast. I've received no fewer than five new software packages in the past week, with the promise of two or three more. I hope to be looking at some of these in the next column.

For a change, I've caught up on most of my correspondence, and I'm still ironing the bugs out of a way to distribute some of the public domain software mentioned in my columns. I'll have a status report on that next time, too.

Additional Information

Rembrandt, $39.95.
Spectre Technologies
22458 Ventura Boulevard, Suite E
Woodland Hills, CA 91364
Orders: 800/628-2828, ext. 918;
technical questions: 818/716-1655
(9:00-5:00, Pacific Time)

GraphNet Systems, Inc.
P.O. Box 337
Reading, PA 19603
215/376-5043

SuperSet, $49.95.
Technical Micro Systems, Inc.
366 Cloverdale
Ann Arbor, MI 48105
313/994-0784

G-Prom, $19.95; T-Prom, $19.95
GT-Prom, $24.95.
NORCOM
9630 Hayes
Overland Park, KS 66212

Church-Related Computer
Programming
P.O. Box 5033
Roseburg, OR 97470-4323
503/673-6689

Slot4 bus expander, $47.50; H89PIP parallel-interface board, $50, plus $24 cable; Spooldisk 89, electronic disk and printer-interface/spooler board, $195 (RS232 option, $15).
FBE Research Company, Inc.
P.O. Box 68234
Seattle, WA 98168
206/246-9815

HDOS Version 3, $25.
Bill Parrott
7010 Caenen Avenue
Shawnee, KS 66216

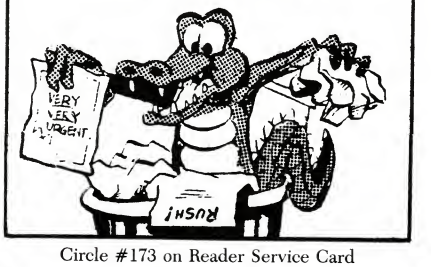
C/80, $49.95.
The Software Toolworks
One Toolworks Plaza
13557 Ventura Boulevard
Sherman Oaks, CA 91423
818/907-6789

Small-C, $30.
Heath/Zenith Users' Group
Hilltop Road
St. Joseph, MI 49085
616/982-3463

S & K Technology
4610 Spotted Oak Woods
San Antonio, TX 78249
512/492-3384

EDIT19, version 3.1 (HDOS only), $4 to CHUG members; $5 to nonmembers. Set including program, manual, tutorial and tutorial manual, $14 to members; $17 to nonmembers.
CHUG membership: $18 U.S.; $31 foreign and Canadian.
Capital Heath Users' Group, Inc.
P.O. Box 16406
Arlington, VA 22215-1406 △

"In" basket looks like your waste-basket? WRITE-HAND-MAN!



Circle #173 on Reader Service Card

FBE Cards For H/Z-89 Computers

SPOOLDISK™89 Electronic Disk & Printer Interface/Spooler–Microprocessor-based card with 128K of RAM acts like fast, quiet disk and also runs printer via Centronics Parallel interface (RS-232 available). Use for normal system printing or for spooled automatic printing. Installs on right-side bus. CP/M® and HDOS software included. ***RS232 $15***
SPOOLDISK™89 $195
Parallel Printer Cable $24

SLOT4 BUS EXTENDER–Adds fourth card slot to right-side bus. Easy installation with no permanent modifications. ***SLOT4 $47.50***

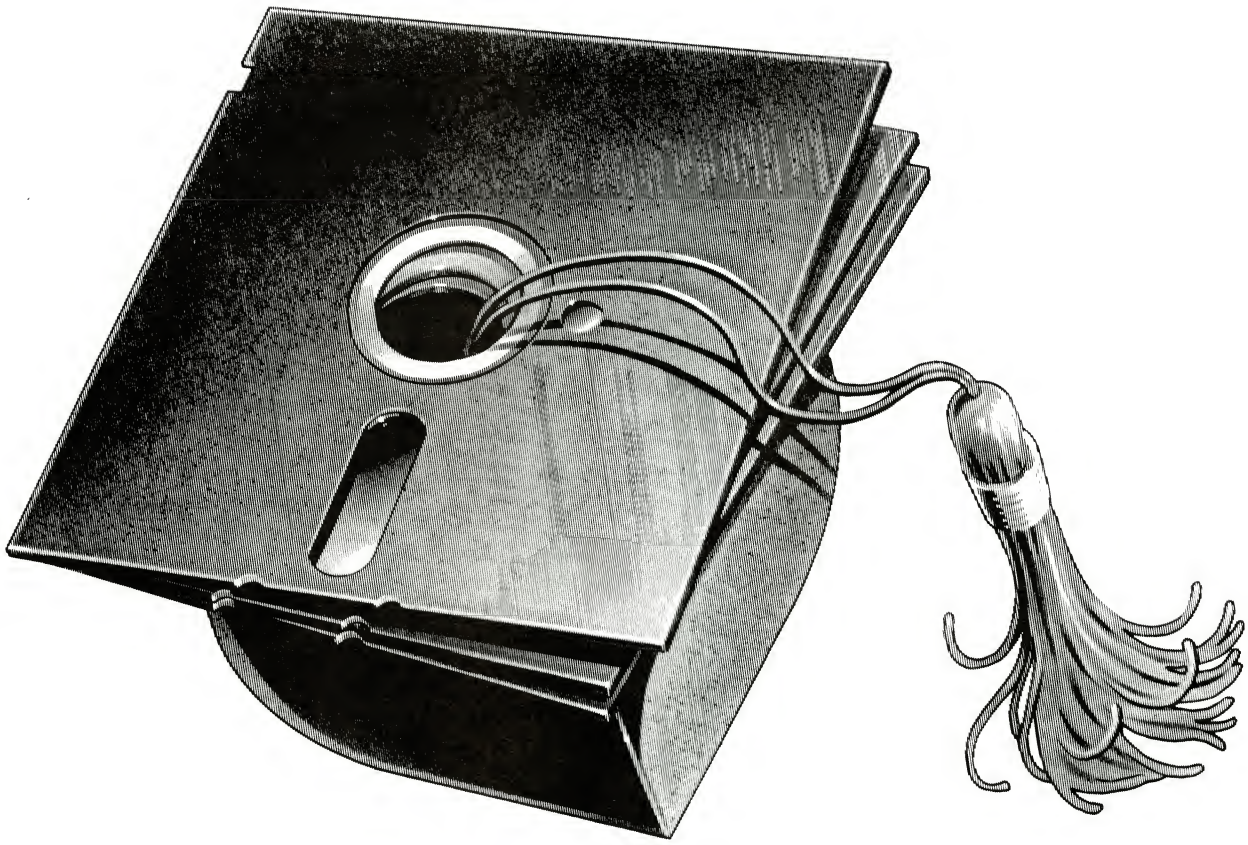
H89PIP PARALLEL INTERFACE–Two ports using 8255 PPI chip. One port bare and one port buffered for use as Centronics Parallel printer interface. Installs on left or right-side bus. CP/M® and HDOS printer driver software included. ***H89PIP $50***
Parallel Printer Cable $24

FBE

FBE Research Company, Inc.
P.O. Box 68234
Seattle, WA 98168
(206) 246-9815

CP/M is a trademark of Digital Research Inc.
VISA and MasterCard Accepted.

Circle #116 on Reader Service Card



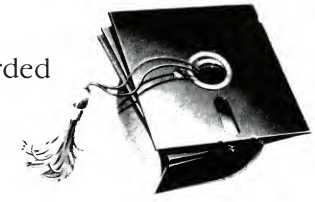
The Z-100 graduates...

...to a new class.

With Enable integrated software.

And class is the word:

- Word processing, spreadsheet, graphics, database and telecommunications equal to the functionality of the best stand-alones.
- Smooth, simple, fast integration between modules.
- Application development tools such as Menu Generation, DBMS Procedural Language reports and a High-Level Language Interface.
- Full data import/export with Lotus 1-2-3, dBASE II and dBASE III, WordStar, PeachText and many other popular packages.



Enable, selected by the U.S. Air Force in one of the largest contracts ever awarded for microcomputer hardware and software. Chosen by the Internal Revenue Service for use by its 18,000 field auditors. Now available to you in a special version designed exclusively for the Z-100.

Learn what others have discovered:

"It's not really a matter of finding ways to use Enable. I haven't found a way not to use Enable."

Economic Evaluator
Dow Corning

"When people come in for a spreadsheet, we give 'em Enable. Database . . . we give 'em Enable. Word processing . . . we give 'em Enable. I simply can't see us outgrowing Enable."

DP Manager
Postal Service HQ

"Six software packages were extensively tested. Enable won hands down."

Jim Wilson
Levi-Strauss

Reviewers rave about Enable:

"If you are looking for one program to do it all, this is the one."

PC Magazine

"Enable . . . may be the first program to make you give up your dog-eared WordStar, dBASE, SmartCom and Lotus 1-2-3 disks."

Business Software

"Each of the five modules . . . has a depth of features and functionality rare in an integrated package."

InfoWorld

Knowledge about the value of Enable saves money. In a special introductory offer, The Software Group is making Enable Z-100 available to you for $195. To take advantage of this valuable opportunity, call The Software Group now at 800-634-3470 or 800-551-1004 (in New York State).

And graduate to Enable.

Circle #226 on Reader Service Card

enable™
From The Software Group.
Worldwide.

Copyright © 1987 The Software Group

Perspectives on Pascal

Ben R. Ezzell

"Perspectives on Pascal"

A first program

No time for sandwiches

The Z100 Graphics Library

System calls and custom features

Ben R. Ezzell is a computer consultant. His software company, Dragontree Press, is located in Boulder, Colorado.

"Perspectives on Pascal"

In "Perspectives on Pascal," I will be offering a potpourri of programming hints, while looking at Pascal utilities and enhancements, books on Pascal and, in general, anything of interest to the Heath/Zenith community. I also invite your questions, comments, and criticisms. And, of course, if you offer a Pascal-related product, I would be pleased to consider reviewing it.

I will not, however, offer reviews based just on on effusive publicity. If you would like to provide a product, utility, or book for review, I will base my comments only on my own observation of the actual performance of the product. And I'll attempt to do so "without offense to friend or foe."

Likewise, if you have a special Pascal programming routine or technique that you would like to share, I'll be pleased to hear from you and will credit (or blame) you accordingly.

Now, if those of you who are already familiar with Pascal will please bear with me, I would like to address readers who are not—yet—acquainted with how Pascal programs are written.

A first program

Traditionally, your first Pascal program might look something like Listing 1. The result, of course, would be two dozen repetitions of "My name is Ben Ezzell", each line indented one space further than the previous.

The one aspect of Pascal most likely to strike the novice is that the source code, as in Listing 1, is written in relatively plain English.

As with any language, there are conventions and abbreviations that must be learned. Borland International's Turbo Pascal, for instance, recognizes only the shorthand clrscr and readln, rather than a verbose Clear_Screen or Read_Line. But Turbo is rarely obscure, and abbreviations such as var for variables and const for constants are easily remembered. Equally obvious is the command gotoxy( ), a directive to position the cursor on the screen at the column and row identified by the values within the parentheses.

On the other hand, the use of indentations is not dictated by Pascal. And in naming variables and other identifiers, upper- and lowercase are equally permissible. Except in comparing strings or individual characters, Pascal does not differentiate between caps and lowercase.

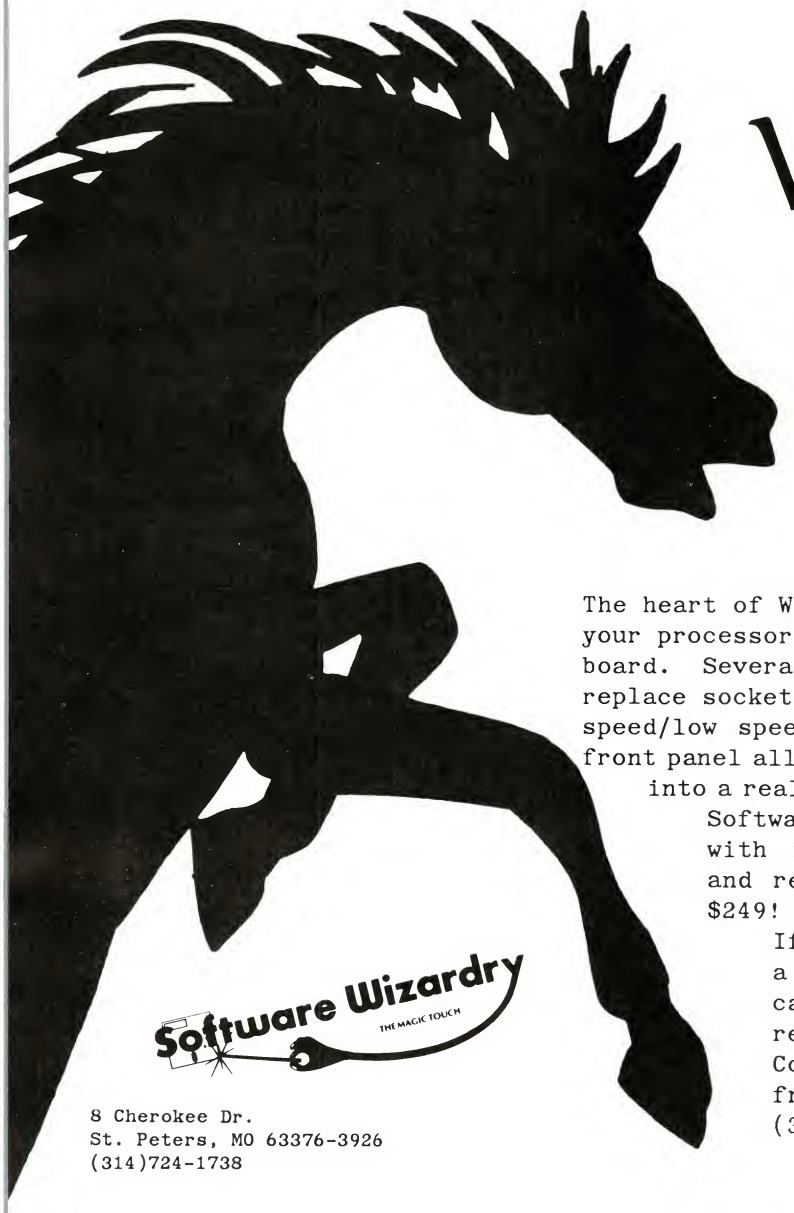
So, whether you use upper- or lowercase characters in naming variables is strictly a matter of personal preference; I have chosen to use a mixture of both to enhance the readability of the source code. A host of variations are equally permissible. You could render ScreenLine and NumberOfLines as screen_line and NUMBER_OF_LINES, while the indentations could be full tabs or omitted entirely.

Personal preference also influences the substance of the program. In Listing 1, the use of the constant
Number_Of_Lines
(a third variation) is superfluous. I might just as easily have said
for ScreenLine := 1 to 24 do
There are circumstances, however, where the use of a declared constant can be quite convenient.

Take, for example, a program to be run

```
program WriteMyName(input, output);
   const
      NumberOfLines = 24;
   var
      YourName : string[30];   ScreenLine : integer;
   begin
      clrscr;
      write('My name is ');
      readln(YourName);
      clrscr;
      for ScreenLine := 1 to NumberOfLines do
      begin
         gotoxy(ScreenLine,ScreenLine);
         write('My name is ',YourName);
      end;
   end.
```

Listing 1. A possible "first" Pascal program (to compile under Turbo Pascal). It merely asks for the user's name and repeats it two dozen times. Each line is indented one space farther than the previous. (Indentation and the particular mixture of upper- and lowercase characters are a matter of personal preference. The author has chosen a form intended to make programs easy to read.)



WILDFIRE™

An INCREDIBLE PERFORMANCE IMPROVEMENT from Software Wizardry

Wildfire has spirit! It will spur your Z-151/161 to run faster than the 8mHz Z-158! Wildfire uses the reliable NEC-V20 chip. It outdoes the 80286 processor chip additions for compatibility with the IBM(tm)PC and costs up to $600 less!

The heart of Wildfire is a daughter board that mounts on your processor board, saddled between it and the video board. Several higher-speed chips are included to replace socketed chips on your processor board. A high speed/low speed switch that mounts on your machine's front panel allows you to trot at normal speed, or break into a real gallop when you really want to ride!

Software Wizardry brings you Wildfire, complete with front panel, installation instructions, and reliable daughter-board design, for only $249!

If you order now, you can try Wildfire with a 15-day guarantee. If not satisfied, you can return it within 15 days for a full refund.

Contact your local dealer, or order direct from Software Wizardry by calling (314)724-1738. Dealer inquiries invited.

Software Wizardry
THE MAGIC TOUCH

8 Cherokee Dr.
St. Peters, MO 63376-3926
(314)724-1738

Also from Software Wizardry...

For the Z-151/152/161

RamPal

The Original Memory Upgrade Kit for only... **$39.95**

RamPal allows you to put up to 640K RAM on your standard memory board. This simple one-chip replacement requires no modification to existing hardware. One bank of 41256 chips is required, two for full 640K memory.

Z-100 Upgrade Package Deal

Reliable Memory/ Speed Upgrade for only ... **$299**

Our special package includes the RamPal 100 Memory Upgrade, 27 RAM chips, and the 8mHz Speed Upgrade. Now you can have compatibility at a price you can afford. Order part number FCC-MEM100FULL.

8mHz Speed Upgrade

Reliable Z-100 Speed Upgrade for true 8mHz Operation. **$149**

This upgrade will bring your Z-100 up to the operating speed of the latest Z-100 version. Plus, you can switch down to 5mHz for programs that require it. Includes over 25 chips, circuit board, and back panel for 5 or 8mHz operation.

Circle #204 on Reader Service Card

with a color monitor. At the beginning, I might declare the constants: HiColor = White;, LoColor = Yellow;, and NegColor = Red;. Within the program, I could declare TEXTCOLOR(HiColor), etc.

Later, the code could easily be rewritten for use with a monochrome monitor. I could declare HiColor = White; (for a normal display), LoColor = Black; (for reverse video), and NegColor = White + Blink; (for flashing highlighted characters). That would be much easier than hunting through the entire code to make the needed changes.

The program header (program WriteMyName(input, output);) is superfluous as regards program execution; but it remains good practice as a way to identify the program.

Alternatively, I might have written our example as it is given in Listing 2. This version produces a result identical to that of Listing 1, but allows me to introduce a new element—the procedure call. In Listing 2, the procedure WhatName is called twice, first to write the prompt before reading the user's input, then again—within the loop—to repeat the string before writing the name.

Granted, this is a very simple example, but it is sufficient to illustrate the use of a procedure that can be called from anywhere within the program. In BASIC, GOSUBs serve that purpose, but there is one important difference. In a BASIC program, we would be referencing a line number—with the attendant confusion this can entail. After renumbering a long program, and wishing to edit it, most of us would probably find it rather difficult to keep track of what line number to use to access each subroutine.

In Pascal, a procedure (in this case, WhatName) will always be called by name. And the programmer can choose the name so that the procedure provides its own documentation—instead of requiring an extensive commentary (in BASIC, REMark lines) to remind us what each block of code is for.

Now, just to prove that I am not blind to the flaws of Pascal. . . . (There are a few—but very few!)

Including indentations, the source code for either version of our example would occupy four to five hundred bytes; but, compiled, either version would be about 10 kilobytes in size. The same program written in assembly language would be much smaller (unless it were very badly written).

So why the discrepancy?

It's because Pascal (in our example, Turbo Pascal) compiles a library kernel that contains *all* functions supported by Pascal—regardless of whether they are needed by your program. (Different versions of Pascal will produce smaller or larger kernels, depending on the implementation of the compiler.)

On more extensive programs, this overhead library becomes less disproportionate and, for most practical purposes, creates no problem. If, however, you are writing a utility, for example, just to read the available space on your disk, a 10K program may seem somewhat excessive. Assembly language will produce a much more compact object code, although it is much more difficult to write.

Having mentioned the major disadvantage of Pascal, I'll end this introduction with a couple of the major advantages of Pascal—specifically, of Turbo Pascal.

No time for sandwiches

Historically (the history of the field being relatively brief), most compilers have been *multipass* compilers—that is, the compiler makes several passes through the source code before, finally, it produces your object code.

The time required for these multiple passes can be significant. (Programmers have traditionally welcomed such occasions as a chance to visit the kitchen for a sandwich.) Also, any single error encountered during the compiler run would produce a subsequent list of five to fifty errors per line beyond the point where the actual error was found. (I exaggerate only slightly.)

A very irritating state of affairs.

I was first introduced to the advantages of Turbo Pascal by way of my initial test program—a simple Sieve of Eratosthenes. (Commonly used as a benchmark, the Sieve tests all integers within a given range to discover which are prime.)

My first effort was badly written in terms of style and efficiency. But when I started compilation and rose for the cus-

The Two Pascals

In 1971, Professor Niklaus Wirth of the Technical University of Zurich, Switzerland, designed a general-purpose, high-level programming language, naming his creation in honor of the 17th-century French philosopher, Blaise Pascal.

Why name a computer language after a three-centuries-dead philosopher?

Actually, the connection is not odd at all—because in 1642, Blaise Pascal constructed the world's first calculating machine. It was limited to performing simple addition and subtraction; but—unlike the abacus and the counting board—it had the unique distinction of carrying digits *mechanically.*

Unlike his calculating machine, Blaise's 20th-century namesake was far from being a primitive first step; Wirth's Pascal quickly became recognized as a valuable language. Pascal allows you to break large programs down into small, easily isolated subprograms. It also provides a logical structure of commands, functions, etc., for the programmer to work within.

If Pascal the philosopher could see Pascal the language today, he would undoubtedly be flattered by the tribute.

```
program WriteMyName;  (* omitting the (input, output) *)
   const
      NumberOfLines = 24;
   var
      YourName : string[30];   ScreenLine : integer;

   procedure WhatName;
      begin
         gotoxy(ScreenLine,ScreenLine);
         write('My name is ');
      end;

   begin
      clrscr;
      ScreenLine := 1;
      WhatName;
      readln(YourName);
      clrscr;
      for ScreenLine := 1 to NumberOfLines do
      begin
         WhatName;
         write(YourName);
      end;
   end.
```

Listing 2. This demonstration program produces the same result as Listing 1. However, the program incorporates a new element—the procedure call. Here, procedure WhatName is used to write the prompt string. It is called twice: first, before reading the user's input; then, within the loop, to repeat the string before writing the name.

★ NOW AVAILABLE FOR C ★ QUICKBASIC ★
★ IBM BASIC/BASICA ★ TURBO PASCAL ★

The Aspen Systems Subroutine Editor (**ASE**) you can call from your programs. Design your own screen layouts - - update in several windows simultaneously. **ASE** is:

- ★ **TRANSPORTABLE** - can be configured for any keyboard and almost any computer or language under MSDOS.
- ★ **VERSATILE** - customize input for any application.
- ★ **COMPLETE** - with full screen edit capabilities and a wide variety of automatic conversions.
- ★ **EASY TO USE** - data and screen layouts described in a single map.
- ★ **FULLY DOCUMENTED** - including examples in BASIC, PASCAL, FORTRAN, C, and even COBOL.
- ★ **AFFORDABLE-**
  ASE is still only..... **$99**
  DEMO (See what ASE can do for you!)..... **$ 3**

The Aspen Systems Subroutine Package (**ASP**) - the companion package for **ASE** - with many functions unavailable or difficult to perform in high level languages. Like **ASE, ASP** is:

TRANSPORTABLE ★ FULLY DOCUMENTED
EFFICIENT ★ AFFORDABLE

ASP includes 150+ subroutines: conversions; sorts; string, bit, date/time functions; decimal arithmetic, and **MORE**.

ASP is still only..... **$130**

ASE and **ASP** include support and demo programs.

Prices are PPD (continental USA).
Colorado Residents add 3%.

P. O. Box 1163
Grand Junction, CO 81502
(303) 245-3262
VISA/MasterCard accepted

Aspen Systems

CP/M and MS-DOS are trademarks of Digital Research and Microsoft, respectively.

Circle #149 on Reader Service Card

Z150/160
HARDWARE ENHANCEMENTS

TURBOPLUS V2.0

High Performance From Your 150/160 (SI=2.8)
Software or Hardware Speed Select at Any Time
Reset From Keyboard at Either Speed
100% Software Compatibility
Correct DOS Clock
Simple, Reversible, Installation
Complete With PC Board, Software, V-20, and High Speed Chips

TurboPlus V2.0 WORKS *Where Others Fail!*

Price $125 ppd.

VMM150 VIDEO CARD ELIMINATOR

Use *ANY* Video Card in 150 (even GB-1)
REMOVE the Heath/Zenith Card
Free One Standard Size Slot
Use Less Power, Run Cooler
Simple Plug-In Installation
Includes PC Board, Decoder and New Back Panel

Price $45 ppd.

TERMS: Check or Money order, UPS COD $1.90 extra.
Dante Bencivengo, P.O. Box 234, Wyandotte, MI 48192

ABSOLUTE 15 DAY MONEY BACK GUARANTEE

Circle #193 on Reader Service Card

It's here! JUPITER

RECORDS MANAGEMENT

NOW FOR THE Z-100
AND ALL PERSONAL COMPUTERS

New JUPITER manages personal information on the Z-100 family and all PC-compatible computers better than *any* database management program.

THE IDEAL RECORD KEEPER

95 big fields ★ Five-line, worldwide addresses ★ International postal codes ★ Worldwide phone numbers ★ Six category fields ★ Fifteen lines of notes ★ Twelve lines of transactions

All tightly compressed. *Blank fields don't take up space.*

POWERFUL

- READY! JUPITER lets you get right to work. No database education needed.
- HUGE! Limited only by your disk capacity.
- FAST! Finds a record in less than one second, with just a few keystrokes.
- SMART! Checks, standardizes, formats, justifies, and capitalizes automatically.
- HELPFUL! On-screen help and examples always available. Outstanding for beginners.

VERSATILE

Read in old databases and mailing lists in practically any format. No need to retype anything.

Searching's a cinch. Complete the sentence, "Select all records where . . . " Why make it hard?

Sort up to three fields. Directly print letters, rosters, mailing labels, invoices, phone directories—*anything*! No word processor needed. Write to disk, printer, or display. Specify exactly how it should look.

. . . AND SO INEXPENSIVE!

All for $99.95—a fraction of the cost of a database management program!

Powerline Systems
131 Jumping Brook Road
Lincroft, NJ 07738
(201) 747-2063

Circle #225 on Reader Service Card

tomary trip to the kitchen, I was wonderfully surprised at the sight of prime numbers *immediately* spilling onto the screen!

Faced with the sheer speed of compilation and execution, I was—very happily—astonished.

Confident from my initial success, I wrote my second program even more sloppily. It was here I discovered a second major advantage. When I compiled it, I was greeted with a message detailing an error in my source code; but Turbo listed just a single error, rather than an interminable list of secondary errors generated by the first.

The prompt instructed me to press the ESCape key. At that point, Turbo's built-in editor took me to the point in the source code where I had omitted a semicolon—conveniently allowing me to quickly repair the omission and return to compile mode again.

This is not to say that the compiler will discover *all* your errors—only those involving syntax, unidentifiable references, and similar mistakes of a coarser nature. But the results are still a world of difference from earlier—and usually excessively verbose—compilers.

My intention has been to offer the preceding only as a tantalizer for those not yet familiar with this excellent compiler language. For a more complete review, I refer you to Hugh Kenner's "Turbo Pascal: The New Basic Language?" in *Sextant* #25, November-December 1986.

The Z100 Graphics Library

Members of the Heath/Zenith community have rarely (if ever) been inclined to merely "make the best" of any situation they see as less than ideal. Pascal users have been equally inventive in providing enhancements to their preferred compiler.

An excellent example of this inventiveness is the Z100 Graphics Library (ZGL) package from Zimbazi Products. Unlike Borland's "Graphix Toolbox"—a collection of business chart routines—Zimbazi's ZGL takes a generic approach to providing the basic tools needed for graphics enhancements on the Z100. And, just as the Z100 provides capabilities lacking in IBM-compatible machines, the ZGL library goes several steps beyond merely supplying the tools missing from Borland's MS-DOS Pascal version.

The ZGL library supplies window support and a PLOT command to turn individual pixels on and off. (This is missing from the generic version of Turbo Pascal.) The ZGL library also offers extensive Turtle commands and graphics-generation tools for plotting and drawing—as well as options for pattern generation, pixel searching, and the ability to create graphics windows. And—quite unlike much software for IBM compatibles—ZGL gives you the ability to use full-color high-resolution graphics in a 1,024 x 512 pixel plotting area. (Unfortunately, of course, the physical CRT size still limits the *display* area to 640 x 225 pixels at any one time.)

To that, add support and procedures for complex image processing, plus "graphics" text handling such as boldface, special character sets, underlining, and super- and subscripts. The principal drawback in this attractive package is the necessity to simplify your program before it can be transported to an IBM compatible.

The ZGL library is written as a series of modules (95+ subprocedures), which may be used on a pick-and-choose basis as required. Complete source code (combined "inline" assembly language and Pascal) is supplied for all routines. ZGL is well documented in its 56-page manual, and comes with a risk-free refund offer. The *only* risk is that you may kick yourself for not having ordered it sooner.

System calls and custom features

No computer language (or none that I've yet discovered) provides all the features that I would like to see or that I occasionally find a need to invoke—and Pascal is no exception.

There are methods, however, to access operating system (MS-DOS) services from within your Pascal program. For a "timely" demonstration, I'll present a routine that allows you to read the system clock using MS-DOS's interrupt $21 and function request $2A (get date) and number $2C (get time). (Conventionally, a hexadecimal number such as 2A would be given as 2Ah; but in Pascal, a dollar sign precedes all hexadecimal numbers; thus, $2A equals 42 decimal.)

To call an MS-DOS function, Turbo Pascal's msdos function will call interrupt $21, which handles calls for MS-DOS system services. But before calling interrupt $21, you must first load a value into the memory register AX of the central processing unit (CPU); this value will tell MS-DOS which function is desired. (Turbo's msdos function accesses interrupt $21's 83 documented system calls. But there are other MS-DOS interrupts with other functions—which are called in a different fashion. I'll discuss them in a future column.)

In Listing 3, the variable regs is used to place the appropriate number in the AX register (regs.AX := $2A00). After the function is executed, register CX will contain the year, and register DX will contain the month and day. (The high byte—the first eight bits—will contain the month, while the low byte will contain the day.)

In a similar fashion, the code in Listing

```
program PascalTimeKeeping;
   const
      Registers = record
                     AX, BX, CX, DX, BP, SI, DI, DS, ES, Flags: integer;
                  end;
   var
      Year, Month, Day, Hours, Minutes, Seconds, Tenths : byte;
                                                  Regs : registers;

   procedure GetDate;
      begin
         Regs.AX := $2A00;            (* the value in the AX register   *)
         msdos(Regs);                 (* selects MS-DOS function call   *)
                                      (* to return the desired values   *)
         Year := Regs.CX-1900;        (* in the register stack          *)
         if Year > 99 then            (* the CX register holds the      *)
            Year := Year-100;         (* current year                   *)
         Month := hi(Regs.DX);        (* the HI-byte of DX has the month*)
         Day := lo(Regs.DX);          (* and the LOW-byte has the date  *)
         writeln(Month:2,'/',Day:2,'/',Year:2);
      end;

   procedure TimeOfDay;
      begin
         Regs.AX := $2C00;            (* but now we want the the time   *)
         msdos(Regs);                 (* from the system registers and  *)
         Hours := hi(Regs.CX);        (* the HI-byte of CX holds hours, *)
         Minutes := lo(Regs.CX);      (* the LOW-byte has the minutes   *)
         Seconds := hi(Regs.DX);      (* while the HI-byte of DX has the*)
         Tenths := lo(Regs.DX);       (* seconds, with 100ths of seconds*)
                                      (* in the LOW-byte of DX          *)
         writeln(Hours:2,':',Minutes:2,':',Seconds:2,':',Tenths);
      end;

begin {main program}
   ClrScr;
   GetDate;
   GetTime;
end.
```

Listing 3. This routine reads the system clock by means of MS-DOS's function request number 2A (get date) and number 2C (get time). In the process of accessing these functions, the regs variable is used to place the appropriate function number in the CPU's memory register AX. (regs is also used to read values stored in the CPU registers.) Compare this with the routine in Listing 4, which works in a similar way, but sets the clock/calendar rather than reading it.

4 also allows us to set the system clock and calendar using interrupt $21, as well as the function-request numbers $2B (set date) and $2D (set time). For these procedures, however, you have to place the appropriate time and date values in the correct CPU registers *before* issuing your system call.

Now, there you have it—simple procedures to access the system clock and calendar (for any MS-DOS/PC-DOS computer). And it didn't hurt a bit, did it?

I hope not—because here's your final exam for this issue:

The routine in Listing 3 must extract the appropriate date and time values, most of which are stored as the high- or low-order bytes in registers CX and DX. To extract these byte values, this routine uses the Turbo Pascal functions hi and lo. But, to *insert* suitable values, the routine in Listing 4 multiplies the value of the high-order byte by 256, then adds to it the value of the low-order byte. Is there a better method that might be used? Or, if not, why not?

The answers—simpler than you may suspect at first—will appear in a future column, as will consideration of trapping the elusive function keys, directory access simplified, and another useful Pascal accessory, Borland's B-Trees Data Base.

Until then, happy hacking. . . .

Ben Ezzell
P.O. Box 33-265
Long Beach, CA 90801

Additional Information

Turbo Pascal, for MS-DOS and CP/M-86, $99.95; for CP/M-80, $69.95; Turbo Graphix Toolbox, $54.95.
Borland International
4585 Scotts Valley Drive
Scotts Valley, CA 95066
408/438-8400

Z100 Graphics Library (ZGL), $39.95 plus $2 shipping and handling. (Texas residents add 6.125% sales tax.)
Zimbazi Products
7405 Berkman Drive
Austin, TX 78752
512/451-2646 △

```
      procedure SetDate(var Year, Month, Day : byte);
         begin
            if Year < 80 then Year := Year + 100;
            Regs.CX := 1900 + Year;
            Regs.DX := 256 * Month + Day;

(* remember, the HI-byte holds the Month so we multiply the Month by 256, *)
(* then add the day: thus January 1st becomes 257 (decimal - or 0101 hex) *)

            Regs.AX := $2B00;

(* now the AX register tells MS-DOS you want to set the date - before, in *)
(* the GetDate procedure, $2A00 was used to read the calendar             *)

            msdos(Regs);
            if lo(Regs.AX) <> 0 then

(* if the LOW-byte in the AX register does not return as zero - we set    *)
(* the HI-byte to 2A and the LOW-byte to 00 before calling MS-DOS - there *)
(* was an error -- most likely an illegal value in the CX or DX register  *)

            begin
               Year := 0;
               Month := 0;
               Day := 0;
            end;
         end;

      procedure SetTime(var Hours, Minutes, Seconds, Tenths: byte);
         begin
            Regs.CX := 256 * Hours + Minutes;

(* for the time of day, we again multiply the hours by 256, then add the *)
(* minutes -- example: if the time is 1:23 PM (1323 hours), the result   *)
(* will be 3351 (0D16 in hex)                                            *)

            Regs.DX := 256 * Seconds {+ Tenths};

(* and the same for Seconds (and Tenths, if desired - otherwise the clock *)
(* is set to a round second                                               *)

            Regs.AX := $2D00;

               (* set AX register to tell MS-DOS we're setting the clock  *)

            msdos(Regs);                          (* call MS-DOS          *)
            if lo(Regs.AX) <> 0                   (* error check as before *)
               then Hours := 25;                  (* set Error Condition  *)
         end;
```

Listing 4. This routine sets the system clock and calendar by means of MS-DOS functions 2B (set date) and 2D (set time). It is similar to the routine in Listing 3, which reads the clock/calendar. Here, though, the appropriate time and data values must be placed in the correct CPU registers *before* the system call is issued.

ATTENTION TURBO PASCAL USERS!
Crash the 64K Barrier

Try **TURBO PACKAGE** now!
90 day money back guarantee!

Modular Programming!

Promotes **REUSE** of working **CODE**
CUTS development **TIME**
IMPROVES system **RELIABILITY**
SIMPLIFIES program **MAINTENANCE**

FILL 640KB with code/data
any way you want
VERY FEW CODE CHANGES.
FASTER than chaining or overlaying

SUPERMATH, FREE!
With purchase of Turbo Package
40 plus LONG (**32-bit math**) routines
Faster than real - big enough for $.
ASM coding insures top performance

Just $49.95 (in TX add tax)

Visa/MCOutside USA add $5.00 shipping
IBM/PC, XT, AT or compatible MS/DOS
machine and Zenith Z100

Write or call for more information

CONVERSATIONAL COMPUTER SYSTEMS
5371 Verbena Rd.
San Antonio, TX 78240
Phone: (512) 692-0353

Circle #213 on Reader Service Card

GREAT PRICES
GREAT BARGAINS
ON
HUNDREDS OF
ITEMS, INCLUDING:

Diskettes
Diskette storage
Power centers
Keyboard drawers
Dot-matrix printers
Pin-feed labels
Ribbons
and much, much more!

NO MINIMUM ORDER

Write or call for our complete list and regular updates.

MATCOMM
(212) 652-2053
after 7 p.m. EST
P.O. Box 604, Bronx, NY 10469

Circle #192 on Reader Service Card

Editing MS-DOS Command Lines—Easily

If the command line didn't come out quite right the first time, using the function keys can save you a lot of re-typing.

William M. Adney

As the Microsoft Disk Operating System (MS-DOS) grows and evolves, and as we learn more as users, it seems that command lines grow longer and more complicated. So, if you make a mistake while typing a command line, or if you need to repeat similar command lines, it would be helpful to be able to *edit* the line, rather than *retype* it.

Well, MS-DOS has not forgotten you. The function keys on your Z100 or Heath/Zenith IBM compatible will let you do that editing.

You can use function keys to help edit an MS-DOS command line, a DEBUG command line, a command line in EDLIN (the line editor that comes with MS-DOS), and (in EDLIN) just about any ordinary text file.

When you've become familiar with the function keys, you're well on your way to learning EDLIN. While EDLIN is no substitute for a full-featured word processing program, it is still quite useful for small jobs.

The information given here applies to all versions of Heath/Zenith's MS-DOS, including the Zenith Disk Operating System (Z-DOS), Zenith's Z100 implementation of MS-DOS version 1. The information applies equally well to IBM's PC-DOS.

Table 1 contains a list of the editing function keys. As you can see, most of the function keys perform identical operations on both the Z100 and the IBM compatibles. Some of the functions are different, however. In those cases, I'll give the IBM-compatible key first, followed by the Z100 function key in parentheses.

You might find it helpful to fire up your computer and practice along as we proceed.

Try the copy and skip functions

Assuming that you have your computer running and that you can see the MS-DOS command prompt (e.g., A>), let's give the function keys a workout—without yet going into why they do what they do.

To start, type 1234567890; then press RETURN to clear the command line. You will get a "Bad command or file name" message, but you can ignore it.

Press the F1 key once. You will see the 1 appear on the command line. Press F1 again, and you will see 2 appear next to the 1. Press the F3 key once, and all of the remaining characters will appear on the command line; you will get the 1234567890 that you originally typed.

Press RETURN to clear the command line. Once again, you will get the "Bad command or file name" error message. (From now on, I will not mention this error message, since it will occur nearly every time I ask you to press RETURN.)

Now press F2, then type a 6 on the main keyboard. You will see 12345 displayed on the command line.

That is how the COPYUP (copy up to a specified character) function works. Press F3 to copy out the remaining characters, and then press RETURN. Now you are an expert on the "copy" functions. (The F1 function, by the way, is called COPY1; F3 is COPYALL.)

That was easy; now let's try the "skip" functions.

Press DEL (F4 on the Z100), then press F3. You should get 234567890: we skipped the first character and copied the remaining ones. If you had pressed DEL (or F4) more than once, the SKIP1 function would have skipped over still more characters.

Press RETURN.

The "skip to a specified character" key (SKIPUP) works just the opposite of the F2 key. Press F4 (F5 on the Z100), then type 6. Notice that nothing happens yet. Now press F3 to copy out the remaining

Function	IBM Compatibles	Z100
Copy one character	F1	F1
Copy up to character c	F2c	F2c
Copy remaining characters	F3	F3
Skip to character c	F4c	F5c
Skip one character	DEL	F4
Enter Insert mode	INS	F6
Exit Insert mode	INS	F7
Define new template	F5	F0
Erase (void)	ESC	SHIFT-F0
End of file character	F6	CTRL-Z

Table 1. MS-DOS command-line editing functions assigned to the special-function keys for both the Z100 and Heath/Zenith's IBM compatibles.

William M. Adney is a faculty member at the University of Texas at Arlington. He's a computer systems consultant, and the author of two FlipFast *guides for MS-DOS, and one for CP/M.*

I want to subscribe to *Buss*!

BUSS #142

The Independent Newsletter of Heath/Zenith Computers

☐ Send me:
- ☐ 20 issues for $28 ($40 overseas)
- ☐ 10 issues for $18 ($24 overseas)

☐ **I've enclosed payment.** Rush me ***The Buss Directory***! (checks must be in U.S. dollars payable on a U.S. bank)
☐ **Bill me.** I'll receive ***The Buss Directory*** when I send my payment.
☐ Charge my ☐ Visa ☐ MasterCard

Card # _____

Expiration date _____

Name _____

Address _____

_____

_____

Buss, Dept. S30
716 E Street S.E.
Washington, DC 20003

S30-B

I want to subscribe to *Buss*!

BUSS #142

The Independent Newsletter of Heath/Zenith Computers

☐ Send me:
- ☐ 20 issues for $28 ($40 overseas)
- ☐ 10 issues for $18 ($24 overseas)

☐ **I've enclosed payment.** Rush me ***The Buss Directory***! (checks must be in U.S. dollars payable on a U.S. bank)
☐ **Bill me.** I'll receive ***The Buss Directory*** when I send my payment.
☐ Charge my ☐ Visa ☐ MasterCard

Card # _____

Expiration date _____

Name _____

Address _____

_____

_____

Buss, Dept. S30
716 E Street S.E.
Washington, DC 20003

S30-B

When mailing in an envelope,
please use ZIP code 20003.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 13098 WASHINGTON, D.C.

POSTAGE WILL BE PAID BY ADDRESSEE

BUSS/SEXTANT
716 E Street, S.E.
Washington, DC 20077-0860

When mailing in an envelope,
please use ZIP code 20003.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 13098 WASHINGTON, D.C.

POSTAGE WILL BE PAID BY ADDRESSEE

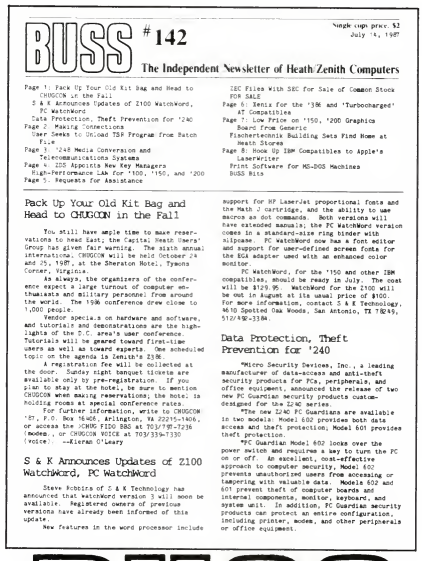
BUSS/SEXTANT
716 E Street, S.E.
Washington, DC 20077-0860

Look what happens when we put our minds together!

Great ideas come together in *Buss* newsletter. Subscribe, and you'll get inside information from the Heath/Zenith world. Since 1977, *Buss* has been a reliable news source and a dynamic forum between users and vendors.

No other Heath/Zenith-specific publication comes to you as often as *Buss*. Twenty times a year (every two to three weeks), you'll be on top of events and information about your Heath/Zenith computer.

Buss costs only $28 for a year's subscription—a small amount compared to the wealth of news and information you'll get to support your system.



BUSS #142

Single copy price $2
July 14, 1987

The Independent Newsletter of Heath/Zenith Computers

Page 1: Pack Up Your Old Kit Bag and Head to CHUGCON in the Fall
S & K Announces Updates of Z100 WatchWord, PC WatchWord
Data Protection, Theft Prevention for '240
Page 2 - Making Connections
User Seeks to Upload TSR Program from Batch File
Page 3 - 248 Media Conversion and Telecommunication Systems
Page 4 - ZDS Appoints Key Key Managers
High-Performance LAN for '100, '150, and '200
Page 5 - Requests for Assistance
IEC Files With SEC for Sale of Common Stock FOR SALE
Page 6 - Items for the '89E and 'Turbocharged' AT Compatibles
Page 7 - Low Price on '150, '200 Graphics Board from Generic
Fischertechnik Building Sets Find Home at Heath Stores
Page 8 - Hook Up IBM Compatibles to Apple's LaserWriter
Print Software for MS-DOS Machines
BuSS Bits

Pack Up Your Old Kit Bag and Head to CHUGCON in the Fall

You still have ample time to make reservations to head East; the Capital Heath Users' Group has given fair warning. The sixth annual international CHUGCON will be held October 24 and 25, 1987, at the Sheraton Hotel, Tysons Corner, Virginia.

As always, the organizers of the conference expect a large turnout of computer enthusiasts and military personnel from around the world. The 1986 conference drew close to 1,000 people.

Vendor specials on hardware and software, and tutorials and demonstrations are the highlights of the D.C. area's user conference. Tutorials will be geared toward first-time users as well as toward experts. One scheduled topic on the agenda is Zenith's Z-286.

A registration fee will be collected at the door. Sunday night banquet tickets are available only by pre-registration. If you plan to stay at the hotel, be sure to mention CHUGCON when making reservations; the hotel is holding rooms at special conference rates.

For further information, write to CHUGCON '87, P.O. Box 16406, Arlington, VA 22215-1406, or access the HCMUG FIDO BBS at 703/978-7236 (modem), or CHUGCON VOICE at 703/339-7330 (voice). --Kieran O'Leary

S & K Announces Updates of Z100 WatchWord, PC WatchWord

Steve Robbins of S & K Technology has announced that WatchWord version 3 will soon be available. Registered owners of previous versions have already been informed of this update.

New features in the word processor include support for HP LaserJet proportional fonts and the Math J cartridge, and the ability to use macros as dot commands. Both versions will have extended manuals; the PC WatchWord version comes in a standard-size ring binder with slipcase. PC WatchWord now has a font editor and support for user-defined screen fonts for the EGA adapter used with an enhanced color monitor.

PC WatchWord, for the '150 and other IBM compatibles, should be ready in July. The cost will be $129.95. WatchWord for the Z100 will be out in August at its usual price of $100. For more information, contact S & S Technology, 4610 Spotted Oak Woods, San Antonio, TX 78249, 512/492-3384.

Data Protection, Theft Prevention for '240

"Micro Security Devices, Inc., a leading manufacturer of data-access and anti-theft security products for PCs, peripherals, and office equipment, announced the release of two new PC Guardian security products custom-designed for the Z-240 series.

"The new Z-240 PC Guardians are available in two models. Model 602 provides both data access and theft protection; Model 601 provides theft protection.

"PC Guardian Model 602 locks over the power switch and requires a key to turn the PC on or off. An excellent, cost-effective approach to computer security, Model 602 prevents unauthorized users from accessing or tampering with valuable data. Models 602 and 601 prevent theft of computer boards and internal components, monitor, keyboard, and system unit. In addition, PC Guardian security products can protect an entire configuration, including printer, modem, and other peripherals or office equipment.

Here's what *Buss* offers:

- ➤New product sources and upgrades for all machines, from the '8 to the '386
- ➤Users' advice and discoveries about their systems
- ➤FREE "For Sale" ads so you can buy or sell equipment
- ➤"Requests for Assistance"—get help for your system through the network of 6,000 *Buss* subscribers
- ➤News and events in the Heath/Zenith community
- ➤Unbiased coverage of Heath/Zenith systems

BUSS

The Independent Newsletter of Heath/Zenith Computers

GET 20 ISSUES FOR $28.
CALL NOW, TOLL FREE:
☏ **800/341-1522** ☏

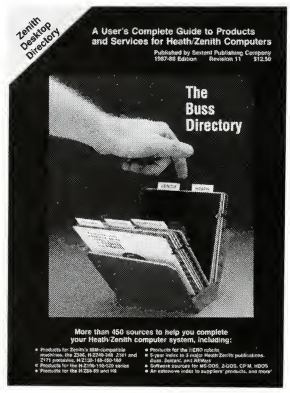
Charge it to your Visa or MasterCard **DATATEL 800™** for orders only, Monday-Friday 8 a.m.-9 p.m., Saturday 9 a.m.-5 p.m. Eastern time

Or mail coupon with payment now to:
Buss, Dept. S30
716 E Street S.E.
Washington, DC 20003

Subscribe now and get this *FREE BONUS*!

The Buss Directory is an annual guide to over 400 Heath/Zenith vendors of hardware and software products, as well as a handy index to *Buss*, *REMark*, and *Sextant* articles from 1982 to 1986. You'll have up-to-date information at your fingertips about available resources for your system. It's an indispensable reference manual.

Pay now and get this directory, a $12.50 value, *FREE*!


Zenith Desktop Directory
A User's Complete Guide to Products and Services for Heath/Zenith Computers
The Buss Directory
More than 450 sources to help you complete your Heath/Zenith computer system, including:

Count me in—start my *Buss* subscription!

Send me:
☐ **20 issues for $28 ($40 overseas)**
☐ **10 issues for $18 ($24 overseas)**

Name _____

Address _____

_____

_____

☐ **I've enclosed payment.** Send me *The Buss Directory* right away! (Checks must be in U.S. dollars payable on a U.S. bank.)

☐ **Charge my** ☐ Visa ☐ MasterCard

Card # _____

Exp. date _____

☐ **Bill me.** Send me the directory when I send payment.

***Buss*, Dept. S30, 716 E Street S.E., Washington, DC 20003**

Circle #107 on Reader Service Card

ZCHESS

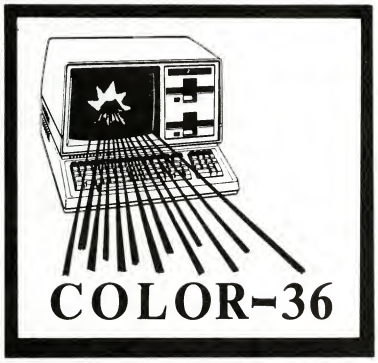
For Z100 (not PC)
REQUIRES 5¼ FLOPPY
192Kb OF MEMORY
DOS vers 2.1 or above

An innovative chess challenge! Infinite levels of play! All moves are checked for legality. Setup, Save, Restore Positions, Change Sides, Keep Time, Tournament Mode and *more features!*

$24.95 (Ohio residents add sales tax)
COMETSOFT TECHNOLOGY
634 Tealwood Drive, Dayton, Ohio 45430
[513] 426-7486

Circle #162 on Reader Service Card

H/Z-100
COLOR SOFTWARE



COLOR-36

COLOR-36 is an assembly - language routine that allows the BASIC programer to paint in 36 colors. This routine works with Zenith's Z-BASIC and Microsoft's GW-BASIC when used on the H/Z-100. It can be used with interpreted as well as compiled BASIC and is faster then the normal basic paint.

The minimum system requirements are an H/Z-100 computer with 64K RAM in each of the RED, GREEN, and BLUE video planes and 192K RAM main memory. A good color monitor is another necessity, as is MS-DOS (2.xx) or higher.

$20.00 (check or money order)

TRAVIS BARFIELD, JR.
3320 Kensington St.
Virginia Beach, Va.
23452

Circle #234 on Reader Service Card

characters, and you should get 67890 on the command line. Press RETURN to get back to the MS-DOS prompt.

Inserting characters—the insert mode

Have you ever forgotten to enter a drive letter and colon in the middle of a long and complicated MS-DOS command? If you have, you will appreciate the convenience of the insert mode.

First, type 123467890 on the command line, and press RETURN. Notice that I omitted the 5 in that sequence. It is no problem to copy out the characters up to the point where we want to insert the 5. Either press F1 four times to copy 1234 or press F2 (copy up to a specified character), then type a 6 on the main keyboard.

To insert the 5 into the command line, press the INS key (F6 on the Z100), then type a 5. To complete the command line, press F3, and all of the numbers will appear in the correct sequence. Press RETURN to store the sequence again.

One point about the insert mode—you automatically exit it when you press any other editing key, such as F1. You can also exit the insert mode by pressing INS again. (On the Z100, however, there's a separate exit-insert key, F7.) In the example above, notice that you did not have to press INS (or F7 on the Z100) to copy the remaining characters onto the line. Even if you had pressed it, the process would have been the same. But why use an extra keystroke?

What is a template?

At this point, it is appropriate to digress a moment to review what is happening inside the computer.

Every time you press RETURN, MS-DOS stores your command-line entry at a special memory location (usually called the command-line buffer) reserved for that purpose. That is the specific reason you had to press RETURN in this practice session—to store the "command line" (1234567890 in this example) into the reserved memory location.

Now that you know what the command-line buffer is, we will change the name to protect the guilty. We will simply wave a magic wand over the name "command-line buffer" and instantly change it to "template"—which is what you'll see it called in the MS-DOS documentation.

In any case, you have been editing the template with those function keys. For our purposes, it is sufficient to remember that "template" is the same as "command-line buffer."

Using the template functions

Have you ever typed a command line and realized that it wasn't really the command you wanted?

As a check, press F3 and you should still get the 1234567890 that we saved as part of the insert-mode practice. (If it is not there, type those numbers in again and press RETURN to store the line; then press F3.)

Now you can try the QUIT INPUT (or VOID) function: press the ESC key (SHIFT-F0 on the Z100). The cursor should print a slash (/), jump to the following line, and wait for input.

If you want, you can give some valid command. MS-DOS will ignore everything before the slash and act on your command as if those invalid characters had never been typed. Or you can press F3 *again*: you will get the 1234567890 again. You can see that pressing ESC (SHIFT-F0) has left the template intact, even though the previous F3 had copied its contents to the screen. The QUIT INPUT has returned the cursor to the beginning of the line, and the template is not actually affected until we hit RETURN.

So, press ESC, then follow it with a RETURN. Now try the F3 again. Nothing is displayed. Why? As far as MS-DOS was concerned, you were back at the beginning of the command line, so the RETURN stored "nothing" in the template.

Another function is for defining a new template (NEW TEMPLATE); to define a new template, press F5 (F0 on the Z100). Whereas ESC left the template intact until a RETURN was hit, NEW TEMPLATE deletes everything in the command-line buffer past the point where the F5 (F0) is hit. Both, however, return the cursor to the beginning of the line. So whatever is in the buffer will be overwritten by what you type after hitting either the ESC or the F5 key.

Frankly, I haven't found much use for these two keys in editing MS-DOS command lines. They can be more useful in EDLIN.

The editing keys—a summary

To summarize function-key editing: we have looked at the three copy functions, the two skip functions, how to enter and exit the insert mode, and how to work with the template.

(If you look at Table 1, you will notice that I have not discussed the end-of-file key, F6—CTRL-Z on the Z100. It makes more sense to look at the uses of that key when we look at EDLIN.)

At this point, you may be wondering what EDLIN has to do with all of this. The answer is that these keys are not only useful for editing the MS-DOS command line, but are also required for the use of EDLIN. These function keys will act somewhat like the cursor-control arrows in a regular word processor.

Next time, we'll look at EDLIN in detail.

Ordering Information

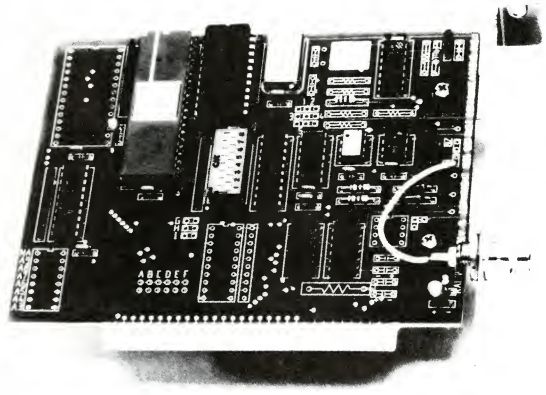
MS-DOS version 3.2 (for Zenith's IBM compatibles) (#OS-63-41), $150; MS-DOS version 3.2 (for Z181) (#OS-63-42), $149; MS-DOS version 3.1 (for Z100) (#OS-63-30), $150.
Heath Company
Benton Harbor, MI 49022
Orders: 800/253-0570; in Michigan and Alaska, 616/982-3411 Δ

ViaNet® & KAL1000™
Local Area Network

Combined to offer you the most cost effective and flexible solution to Local Area Network your IBM® PC/AT's, compatibles and Zenith Z100 systems.

KAL1000 Adapters plug into any available slot and are connected via an RG-58 coaxial cable and BNC connectors. The cable can be as long as 10,000 feet and up to 254 logical users can be networked. KAL1000 uses a 2 Mega bits/sec baseband signal and a unique CSMA/CA/CD/PA network access method which combines both Token and CSMA systems to provide extremely reliable and efficient communication. The adapter uses less than one Watt of power and is complemented with a semi-custom gatearray chip for increased reliability.

ViaNet LAN File Server software is a Unix-like extension to MSDOS® which provides a fully distributed peer-to-peer network operating system. ViaNet is a serverless system and all resources on the network nodes may be optionally shared through the extended MSDOS hierarchical file structure. Redirection of requests is completely transparent to users. ViaNet provides full resource and data security for Owner, Groups of Users and All Users via passwords. File and record locking is supported under MSDOS 3.1. Compatible to DBASE-III Plus, Lotus, Multiplan, WordStar, RBase 5000, Word Perfect, ... etc. Also includes a full featured print server which also operates in background.



Complete Price **$395.00** (with IBMPC adapter)
$445.00 (with Z100 adapter)

SoftNet

SoftNet Communication, Inc.
15 Hillcrest Drive, Great Neck, NY 11021
(516) 829-6536 TLX 650-309-6952 MCI UW

KAL1000/TM SoftNet Communication, Inc., ViaNet/Registered TM ViaNetix., IBM/Registered TM International Business Machines., MSDOS/Registered TM Microsoft.

Circle #132 on Reader Service Card

"..VERY SIMPLE,EASY TO USE, and BLAZINGLY FAST..VERY HIGHLY RECOMMENDED TOOL.."
-Henry Fale H-SCOOP

The ***SANDER***
from CB Sftwr
Multi-File SEARCH and REPLACE
- Reads in up to 512 files. Any MSDOS Wildcard/Path accepted
- Search AND Replace Strings up to 80 characters in Length.
- FAST- S/R 15,000 lines in 2 min.
- User Selected Case dependancy
- Integrated FULL FUNCTION Line Editor / Optional Querry Mode.
- Enter ALL information from the MSDOS command line
- Z-100 and Z-150-241 versions
- Price $30 including Shipping
- More available from CB Sftwr !

" DON'T REMEMBER WHEN I'VE SPENT A BETTER 30 Bucks .."
-Henry Fale- H-SCOOP

To Order or get information Write or Call - CB Sftwr
PO Box 279, Wade,NC 28395
1-919-485-8812 M-F 7:00-4:00

Circle #231 on Reader Service Card

ANNOUNCING FAST EDIT II

Even if you love your word processor...

YOU STILL NEED A GOOD ASCII TEXT EDITOR

that produces text directly compatible with MS-DOS, modems, printers, compilers, etc.

YOU NEED FAST EDIT II

• Easy to use • Easy to learn • The fastest text editor you'll ever use, which features:

Full 24-line WYSIWYG display
Word wrap • Paragraph realignment
Variable margins • Adjustable tabs
File merges • Global searches

AND MANY MORE FEATURES

For IBM compatibles, MS-DOS 2.0 or greater, 40K minimum memory (occupies 30K disk space).

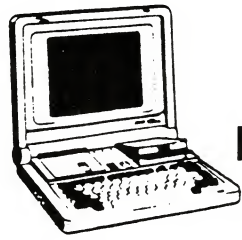
Send $19.95 for U-Print Disk Handbook version, or $24.95 with pre-printed Handbook to:

HUBERT L. REEDER
P.O. Box 2791, Lake Placid, FL 33852

Circle #242 on Reader Service Card

PAYLOAD
COMPUTER SERVICES

FINAL Z-100 SOFTWARE CLOSE OUT



THE NEW 8 MEG ZFL-181-93 LAPTOP PORTABLE COMPUTER $1739.00

The Zenith Laptop computer now runs at 8 Meg. The ZFL-181 has been top rated by every article we've seen. It's a true winner in every respect. Please **MAIL** or **PHONE** your order today and expect prompt service. **MASTERCARD** and **VISA** gladly accepted with no additional charge.

★★★ ZENITH SOFTWARE FOR THE ★★★ Z-100 SERIES COMPUTERS

Zenith packages with software, manuals and registration cards for the original Z-100 computer series (not for the IBM compatibles).

PART NUMBER	DESCRIPTION	LIST PRICE	SALE PRICE
MS-463-1	Z-Basic (16 bit) interpreter	$175.00	$10.00
MS-463-7	Multiplan	$195.00	$10.00
CB-463-11	Z-Chart	$150.00	$10.00
CD-463-2	Condor File Manager	$299.00	$10.00
PK-100-4	All 4 listed above	$819.00	$38.00
MS-253-1	Microsoft BASIC-80 (8-bit)	$175.00	$10.00
OS-53-2	CP/M-85 (8 bit)	$150.00	$15.00
OS-63-4	Z-DOS	$150.00	$20.00
CB-463-9	PECON Peachtree to Condor	$99.00	$15.00
RS-463-5	Peachtree Inventory Management	$499.00	$15.00
WI-463-1	Remote Batch Terminal Emulator	$899.00	$10.00

★★★ ZENITH SOFTWARE FOR THE ★★★ Z-150/160 SERIES COMPUTERS

PART NUMBER	DESCRIPTION	LIST PRICE	SALE PRICE
LEXISOFT	Spellbinder	$495.00	$292.00
LEXISOFT	Desktop Publisher	$695.00	$445.00
BP-5063-8	BPI Personal Accounting	$195.00	$55.00
SR-B410	DS BACKUP (hard disk)	$70.00	$62.50
SR-4500	Norton Utilities 4.0	$99.00	$69.00
SR-3950	dBase III plus	$695.00	$479.00
SR-4100	DAC EASY Accounting	$69.00	$62.00
SR-3090	LOTUS 123	$499.00	$389.00
OS-463-41	MS-DOS 3.2	$149.00	$108.00
CB-5063-28	DIAGNOSTICS	$79.00	$59.00

★★★ ZENITH SOFTWARE FOR THE ★★★ H/Z-89 SERIES COMPUTERS

PART NUMBER	DESCRIPTION	LIST PRICE	SALE PRICE
HES-837-1	Microstat (96 TPI)	$249.00	$15.00
HCP-837-1	Pearl #3 Program Generator (96 TPI, Requires C-BASIC)	$450.00	$15.00
SC-837-1	SuperCalc	$195.00	$40.00

★★★ ZENITH MONITORS ★★★

ZVM-135 Color 13" High Res. RGB/Composite $475.00
ZVM-1330 Color 13" High Res., RGB only $497.00
ZVM-1220 Amber Non-Glare Flat Screen $169.00
ZVM-1230 Green Non-Glare Flat Screen $169.00
ZVM-1240 Amber Flat Screen TTL input $192.00
ZVM-1200 Tilt Swivel Base $17.00
ZVM-1380 EGA Color 13" $615.00
MITSUBISHI CGA Color $366.00
MITSUBISHI EGA Color $449.00

★★★ ZENITH IBM COMPATIBLE COMPUTERS ★★★

Z-159-12 Two 360K floppy disk drives, 256K RAM, EGA video. Retail $1899. Payload $1559.00

Z-159-13 As above but with 20 MEG Winchester Drive and one floppy disk drive. Retail $2499. Payload $1949.00

ZFL-171-42 PORTABLE with Backlighted LCD screen, 256K RAM, two 1/3 heigh 360K disk drives, ROM based software, Approx. 14.3 lbs. Retail $1999.00. Payload $1589.00

ZFL-181-93 LAPTOP PORTABLE with the amazing Supertwist LCD backlit screen 640K RAM, two 720K 3.5" disk drives, clock, P & S Ports, 8 MEG. Retail $2399.00. Payload $1739.00

ZF-248-81 AT Compatible with one 1.2 MEG Floppy Disk Drive, 512K RAM, 8 Mhz, 0 Wait States. Retail $2999.00, Payload $2191.00. Requires Z-329 or Z-409 Video Card listed below.

ZW-284-82 AT Compatible with all above plus EGA Color Card, one 20 MEG 85 ms Hard Disk Drive. Retail $3699.00, Payload $2962.00

ZW-248-84 AT Compatible with EGA Color Card and all above plus one 40 MEG 30 ms Hard Disk in place of 20 MEG Drive. Retail $4499.00 Payload $3441.00

All above come with MS-DOS supplied Zenith. Payload charges only $5.00 for shipping of prepaid orders. We can enhance the above computers with more memory or larger winchester drives at low costs to you.

★★★ UPGRADE ACCESSORIES FOR Z-150/160 ★★★ SERIES COMPUTERS

SmartWatch from FBE Research. Installs in ROM Socket on CPU Board in Zenith computer series Z-100/150/158/160. This tiny jewel of a product contains a ten year battery and keeps your computer informed of both time and date at each boot-up. Complete instructions and software included $44.00

MEMORY KIT #150-256-18. Includes a ZPAL chip which allows use of 256K RAM chips included (18 pieces 256K 150 ns RAM chips). Kit increases 128k memory to 640K or 256K memory to 704K. All chips plug into your existing Zenith Memory Board. Unbelievable but true $87.00

Winchester Hard Disk Drive Internal Set-up. Includes Winchester drive, controller/interface card, cables and all hardware. With 20 MEG (formated) drive $355.00 30 MEG $398.00. May be installed in Z-148 using an Expansion Card sold below.

PTZ-148 Expansion Card for Z-148. Includes 2 expansion slots plus a clock/calendar. $118.00

Winchester Hard Disk Drive External Set-up. Includes Winchester drive, controller/interface card, power supply and case with fan.
With 20 MEG (formated) drive $549.00
With 30 MEG (formated) drive $592.00

SECOND INTERNAL DISK DRIVE with instructions and hardware $108.00

EVERCOM INTERNAL MODEM. Fully Hayes compatible 1200/300 baud with powerful BitCom software included $128.00

★★★ VIDEO CARDS ★★★

Z-171-3 Z-171 Video Card RGB/Comp..... $189.00
Z329 High-Resolution Monochrome $182.00
Z-409 Color Graphics/Monochrome for Z-200 ..... $205.00

★★★ UPGRADE ACCESSORIES FOR Z-100 ★★★ SERIES COMPUTERS

HIGH DENSITY 1.2 MEG DRIVES. External floppy drive set-up complete with drive, power supply, case and cable. Ready to connect to your 8" floppy controller. $277.00. Dual Drive Unit $424.00

COLOR GRAPHICS UPGRADE. All memory chips (16 pieces 150 ns) required to update Z-100 Series computer for color. Installation instructions included. Order Memory Kit #100-64-16 .....$21.50

MEMORY UPGRADE. All memory chips (9 pieces 150 ns) required to upgrade from 128K to 192K RAM. Installation instructions included. Order Memory Kit #100-64-9 .....$12.50

ZMF100A by FBE Research. A modification package which allows 256K chips to be used on the old-style motherboard to reach 768K. Simple assembly with no soldering or trace cutting. Compatible with Easy PC and Gemini Emulator. $60.00 alone or $148.50 with 27 256K RAM chips included.

SmartWatch by FBE Research. If you don't have a clock for your Z-100, get this one. More details under Z-150 upgrade listings $44.00

GEMINI EMULATOR BOARD. Makes the Z-100 compatible with the IBM PC library of programs $432.00

UCI EASY PC. IBM PC Emulator. Makes your Z-100 IBM Software Compatible. Full 8 MEG operation, color graphics and audio compatible. Retail $699.000, Payload $477.00

UCI EASY 87. Add an 8087 Numeric Coprocessor. $69.00 for the board without an 8087 Chip. With 5 MEG 8087 $197.00 or with 8 MEG 8087 installed $234.00

UCI MEMORY UPGRADE CARD. We recommend this one highly. The board has sockets for up to 2 MEG of RAM. With no RAM installed $328.00. With RAM installed and fully tested, 512K $387.00, One MEG $446.00, Two MEG $564.00 Add $35.00 for EasyDrive RAM Drive Software if desired.

UCI RAMSAVER. Maintains power on UCI MEMORY CARD RAM when computer is off. Save your programs in RAM with your computer off. Payload $177.00

UCI EASY-I/O. S-100 board that provides IBM PC communications port compatibility with your EasyPC. Easy I/O-1, One Serial Port $91.00. Easy I/O-2, Two Serial Ports, One Game Port, Clock-Calendar $127.00

UCI EasyWin. Winchester Drive Systems at reasonable prices. Complete Hard Disk Systems for mounting inside your Z-100. Systems complete with Seagate Drives, 21 MEG $632.00, 31 MEG $727.00 System without Drive and Controller $277.00

CDR Z-100 SPEED MODULE. Run your Z-100 Computer at 7.5 MHz. Installs easily with no soldering. Externally switchable between Speed and Normal mode. Payload $48.00

★★★ UPGRADE ACCESSORIES FOR H/Z-89 ★★★ COMPUTERS

Magnolia Microsystems Double Density Controller. Soft-sectored disk controller. Supports up to four each 5.25" and 8" disk drives. Complete with cables, installation instructions and CP/M ...$294.00

Magnolia Microsystems Memory Upgrade Card. Installs in your H-89 to increase memory from 48K to 64K. Payload price $50.00

INTERNAL DUAL DRIVE SETUPS. Includes two half height double sided disk drives and all hardware and connectors required to mount inside your H-89. Steel mounting shield/case included.
MITSUBISHI MF501 Setup, 48 TPI, 6 MS seek, 320K $279.00
MITSUBISHI M4853 Setup, 96 TPI, 3 MS seek, 640K disks ..$284.00

★★★ HALF HEIGHT FLOPPY ★★★ DISK DRIVES

MITSUBISHI M2896	8"	48 TPI DS/DD	1.2 MEG	.....$375.00
MITSUBISHI M501	5.25"	48 TPI DS/DD	320K/360K	....$105.00
MITSUBISHI M504	5.25"	96 TPI DS/DD	360K/1.2 MEG	.$152.00
MITSUBISHI M4853	5.25"	96 TPI DS/DD	640K	..... $96.00

★★★ LAPINE HARD DISK DRIVES ★★★

TITAN 20 MEG Winchester Hard Disk $319.00
With Controller & Cables $395.00
TITAN 30 RLL Winchester Hard Disk $349.00
With RLL Controller & Cables $442.00

★★★ SEAGATE HARD DISK DRIVES ★★★

ST-225 20 MEG Winchester Hard Disk $295.00
With Western Digital Controller & Cables $355.00
ST-238 30 MEG, Requires RLL type controller $309.00
With RLL Controller & Cables $398.00
ST-4038 30 MEG High Speed for Z-200 .....$621.00
ST-4051 40 MEG High Speed for Z-200 ..... $770.00
ST-4096 80 MEG High Speed with Software..... $984.00
ST-251 40 MEG High Speed Z-150/200 .....$499.00

★★★ POWER SUPPLIES AND CASES FOR DISK DRIVES ★★★

Rugged steel construction with heavy duty power supplies. Purchase with drives and we will install drives in case.

Single 5.25" unit for Full Height Drive $68.00
Dual 5.25" unit, for Half Height Drives $92.00
Dual 8" unit with fan, for Half Height Drives $188.00
Face plate for single drive in dual case $8.00
For WINCHESTER Drive, with fan $191.00

★★★ CHIP SPECIALS ★★★

The finest RAM available and at PAYLOAD prices. Order one to one thousand chips and add only $2.00 for shipping.

64K Dynamic RAM, 150 ns .....$1.35 each
256K Dynamic RAM, 150 ns ..... $3.28 each
256K Dynamic RAM, 120 ns ..... $3.87 each

V-20 CHIPS. High Speed NEC V-20-8 8088 replacement. These run at up to 8 MEG and are said to increase CPU speed 10-30%.
Payload $14.75

8087 MATH COPROCESSOR CHIPS. Speeds and improves numeric processing. 5 MEG 8087-3.... $129.00, 8 MEG 8087-2 .... $165.00

*** PANASONIC DOT MATRIX PRINTERS ***

KPX-10801 120 cps 10" $219.00
KPX-10911 160 cps 10" $272.00
29cps NLQ
KPX-10921 180 cps 10" $338.00
33 cps NLQ
KPX-1592 180 cps 16.5".....$421.00
38 cps NLQ
KPX-1595 240 cps 16.5".....$462.00

MasterCard

PAYLOAD
COMPUTER SERVICES

VISA

15718 SYLVAN LAKE, HOUSTON, TEXAS 77062
PHONE (713) 486-0687

Your satisfaction is guaranteed. All hardware carries a 90 day warranty. VISA and MASTERCARD orders accepted. Add $5.00 to all prepaid orders for handling and shipping, we pay the balance. Actual shipping costs billed for net billing orders to approved accounts. We accept purchase orders from schools, government and approved accounts. Mail or Phone your order for prompt service. Texas residents please add 7.125% state sales tax.

Circle #147 on Reader Service Card

C Notes

Joseph Katz

Achieving minimum security through C

PASSWORD.C: minimum password protection

OR.C: minimum encryption

The David Copperfield Scam

Achieving minimum security through C

I'm absolutely the wrong person to use a password-protected program: my mind doesn't retain even all the ordinary stuff essential to passing through life unharmed. So I'm certainly not going to trust it as the sole repository for a one-word key to anything truly important.

And yet I'm fascinated by passwords, encryption, and other cloak-and-dagger stuff. Also, like most people, I have an occasional need for such security devices. But since my brain is a sieve, and since my needs are too occasional for such secrets to stick, I've had to strike a balance between maximum security and none at all.

To help me in that task, I've written the programs discussed below. The real point of sharing the following diversions with you, however, is that they're enjoyable demonstrations of how one might apply some aspects of the C programming language.

I call my concept "minimum security."

That concept is a distant relation to the stratagem employed by Monsieur D___ in Edgar Allan Poe's "The Purloined Letter": he effectively hid the stolen letter by simply leaving it in plain sight with some other papers.

The rules of the security game, however, would have required Mr. D___ to try for maximum security—locking his boodle in a safe, for example. Because the police played by those rules and Mr. D___ didn't, the police wound up chasing their tails—while Poe invented the literary genre now known as "the classic detective story."

Mr. D___ employed indirection. That's what I employ. It's roughly the same as keeping your money in an unlocked desk drawer across the room from the most impressive safe you can find. Burglars stay out of your drawers and spend their time trying to open the safe.

At least that's the theory.

What follows are three approaches to my concept of minimum security, each with its own programs. The first approach lets you add simple password protection to the programs you write. The second approach lets you add simple encryption to ordinary text files, then decrypt them simply.

The third approach is what I call "The David Copperfield Scam," in honor of either the popular magician or the Charles Dickens character. I don't remember which. Whatever the source of its name, this approach lets you hide entire directories in plain view. I'll explain later.

PASSWORD.C: minimum password protection

Most password routines worth the name take the trouble to ensure that the password itself is encrypted wherever it appears within the running program. Otherwise, you'd need only to call up the supposedly protected program under MS-DOS's DEBUG (or any other editor that can handle executable code), and look for some likely bit of ordinary text. Once you'd figured out that the programmer was foolish enough to use an unencrypted password, you could break through in a skinny minute.

So, I use unencrypted passwords on programs for which I require only enough security to block the naïf—but not enough to lock me out when I forget the magic word. Please don't laugh. It's a sensible approach to preventing casual encroachment, while leaving me a wide-open back door for when I forget the key.

Take, for example, programs I don't want available to any snoop with access to the computer in my university office. Those are the people I want to keep out of my calendar program, which keeps an up-to-date list of things I might get around to doing some day.

Yes, anyone who knows DEBUG can discover my password because it's not encrypted or protected in any other way, but I don't care. All I really want is minimum security against people with more curiosity than computer knowledge or skill. And I must have that back door for when I forget the password. Minimum security is all I need.

getpas( )

If you have occasion for using minimum security on a program of yours, take a look at my getpas( ) function in Listing 1.

It's cute. From your program's main( ), call getpas( )—passing to it as an argument whatever prompt you want displayed as soon as the program executes. That prompt may be as long or as short as you like.

So what's cute about a prompt? Well, what if the prompt is "Press the ENTER key to continue"? The consequence of obeying that prompt is almost guaranteed to cause apoplexy in snoops: they do, but it doesn't.

Or what if the prompt is a simple dot?

EVERYTHING THE C PROGRAMMER NEEDS

Eco-C88 C Compiler:

A full, professional C compiler with many ANSI enhancements at an unbelievably low price.

* Prototyping, enum, void data types, plus structure passing & assignment * All operators and data types * Over 200 library functions * cc and mini-make for easy use * 8087 support * ASM or OBJ output * Lint-like tiered error messages * Fast code * CED editor (edit-compile-link from within the editor) * Expanded user's manual * Not copy protected * All for only $59.95!

Eco-C88 Flexi-Graph Graphics Package

Everything you need to write dramatic graphics effects into your Eco-C88 C programs.

* EGA, CGA, and Z100 support * Over 100 graphics functions (many are PLOT-10 compatible) * Most assembler support routines are outside small model code-data * Write thru BIOS (for compatibility) or to memory (for speed) * Graphics function help from CED editor * World, pixel or turtle color graphics modes * 47 standard fill patterns, 17 line dashing patterns, Hershey fonts, plus user defineable fill, dash, and fonts * Supports view areas, rotateable fonts, clipping, arbitrary fill areas, extensive error checking, examples, and user's manual * Only $39.95

Eco-C88 Windowing Library

Use this library to build pop-up windows, help windows, selection menus, special effects—anywhere you need an attention getter.

* CGA and EGA support * Control any program that goes through the BIOS * Use up to 255 windows * No special window commands — use plain old printf( ) to write to a window * Resize and move windows * Custom window titles and borders * Can be used with ANSI device driver * Most window code-data are outside small model * User's manual and examples for only $29.95

Ecosoft Librarian

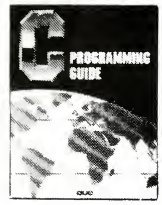
Combine your modules, functions, and subroutines into your own library for easy link commands. Compatible with any standard MSDOS OBJ files * Add, delete, and extract from a library * Get table of contents or index of a library * Combine libraries, control library page size, use switches for combinations, process complex library requests, use wildcards, and do library directives from command files * Complete with user's manual for only $29.95

Developer's Library

Contains the source code for for all library functions, including the transcedentals, memfiles, and those written in assembler. $25.00 with order, $50.00 if ordered later. (Sold only to Eco-C88 owners.)

Ecosoft Inc.
6413 N. College Ave.
Indianapolis, IN 46220

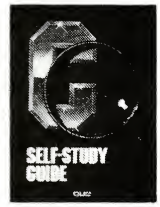
Eco-C88 C compiler requires an IBM PC, XT, or AT (or compatible) with 256K of memory, 2 disk drives and MSDOS 2.1 or later.



C Programming Guide

(Purdum, Que Corp.)

The second edition of the B. Dalton bestseller. Perfect for those just getting started with C. Includes discussion of many X3J11 ANSI Standards Committee recommendations. Many error messages from Eco-C88 give page references to this book. Price is $20.00 plus $2.00 shipping.



C Self-Study Guide

(Purdum, Que Corp.)

Using a question-answer approach, this book is filled with shortcuts, tips, techniques, and traps to avoid when learning C. Price is $17.00 plus $2.00 for shipping.

C Programmer's Library

(Purdum, Leslie, Stegemoller, Que Corp.)

Another B. Dalton bestseller. An intermediate C text for the programmer that wants to get the most from the language. Contains source code for many functions including an ISAM file handler. Price is $22.00 plus $2.00 for shipping.

To order, call or write:

1-800-952-0472 (for orders) or **1-317-255-6476** (tech. info.)

ORDER FORM CLIP & MAIL TO:
Ecosoft Inc., 6413 N. College Ave., Indianapolis, IN 46220

- ☐ Eco-C88 C Compiler $59.95 _____
- ☐ Eco-C88 Flexi-Graph Graphics Package $39.95 _____
- ☐ Eco-C88 Windowing Library $29.95 _____
- ☐ Ecosoft Librarian $29.95 _____
- ☐ Developer's Library $25.00 ($50.00 if not with order) _____
- ☐ C Programming Guide $20.00 _____
- ☐ C Self-Study Guide $17.00 _____
- ☐ C Programmer's Library $22.00 _____

SHIPPING _____ $4.00
TOTAL (IND. RES. ADD 5% TAX) _____

PAYMENT: ☐ VISA ☐ MC ☐ AE ☐ CHECK
CARD# _____ EXPIR. DATE _____
NAME _____
ADDRESS _____
CITY _____ STATE _____
ZIP _____ PHONE _____

ECOSOFT

Circle #215 on Reader Service Card

Those familiar with dBASE could entertain themselves for quite a while by exercising their knowledge of its command language, only to find themselves returned to MS-DOS each time. Or what if the prompt mimics the MS-DOS prompt? What would you do when faced with a program that seems to run but does nothing at all?

MS-DOS function 7

My getpas( ) function displays the prompt and waits for the user's input. I get the input by means of MS-DOS's function call 7 (direct console input), which accepts characters from the keyboard without echoing them to the screen and without checking for CTRL-C. To do so, I use bdos( ), which is the way most C compilers for CP/M and MS-DOS make function calls.

In doing without the echo, my intent was not so much to keep the user from seeing what *doesn't* work, as it was to prevent anyone else from seeing what *does*. I don't want anyone looking over my shoulder to see either the password or how the program behaves.

As you can see in Listing 1, the user's input is stored in the array reply. In this case, that's sized at eight characters for the password SEXTANT. So long as the input doesn't exceed eight characters, all is well. When the ENTER key is eventually hit, action will drop down to main( ); there, we'll see if the actual password has been given.

MS-DOS function 7 gets one character at a time. Most times this is an irritating way to program for string input, because you have to stuff one character at a time into an array for the string. This time, however, it's just right, because it permits you to get even cuter.

If more than eight characters are input, your position in the reply is set back to zero, effectively clearing the array. And people can type their heads off without getting even a hint that their input has already been rejected because it had too many characters.

The reason they can type forever, by the way, is that the clrstdin( ) function flushes the keyboard buffer after each keystroke is read. That way, there's no deposit and no return. Each keystroke is relegated to history immediately after it's typed. (That means you've got to type it in correctly the first time. The backspace to correct your error will be treated as just an additional incorrect character.)

No, I wouldn't use getpas( ) and an unencrypted password on any program that demanded maximum security. Remember, though, that if I had such a program I wouldn't be able to use it myself. At least not twice.

```
/*
**  PASSWORD.C -- prompts user for a password and branches accordingly
**
**  Version 1.00
**  By Joseph Katz for "C Notes" in SEXTANT
**  Copyright 1987 by Joseph Katz.
**
*/

#include <stdio.h>
#include <dos.h>                    /* for Microsoft C 4.0 */

#define PASSWORD "SEXTANT"

char    *getpass(prompt)
char    *prompt;
{
    /* change the array size for max permissible user reply */
    static  char    reply[8];      /* string for user's response */
    int i;                          /* position in that response */
    register char   *position;

    fprintf(stderr, "%s", prompt);

    /* initialize everything */
    position = reply;
    i = 0;
    *position = clrstdin(7); /* flush keyboard buffer */

    /* get chars typed by user, up to magic number */
    do {
        if  (*position == '\r')         /* quit if ENTER key pressed */
            break;
        i++;                            /* increment the counter... */
        position++;                    /* and build the string... */
        *position = bdos(7);          /* with this character added */
    }
    while   (i < strlen(reply)+1);                /* allows for NULL terminator */

    /* accept but discard any remaining characters in user's reply */
    *position = 0;
    bdos(2, '\r');
    bdos(2, '\n');
    while   (bdos(11) & 0xff)
        bdos(7);
    return(reply);
}

/* flush the keyboard buffer */
clrstdin(func)
int func;
{
    bdos(func,0x0C);
}

main()
{
    char *response;

    response = getpass("PASSWORD: ");
    if(strcmp(PASSWORD,response) != NULL) {
        printf("Naughty, naughty.");
        exit(1);
    }
    else {
        printf("You have said the magic word.");
        exit(0);
    }
}
/*
        main() ends
        end of PASSWORD.C
 */
```

Listing 1. The getpas( ) function can be included in a program to provide password protection. Your program provides getpas( ) with a prompt to be displayed on the screen. Then getpas( ) will display the prompt and evaluate user input to verify that the correct password (in this case, SEXTANT) has been typed in.

OR.C: minimum encryption

That same notion of "minimum security" I proposed in connection with programs can be applied to text files, too.

Let's understand at the beginning that I'm talking only about text files of ordinary ASCII characters. There are other kinds of text files, such as those containing formatting codes introduced by most word processing programs; but I'm not talking about them here.

When you look at an ASCII chart, you'll see that its codes cover the range 0 through 127 in the decimal radix, which translates to the range 0 through 7F in the hexadecimal radix. The first 32 codes are assigned to so-called "control characters," which are reserved for controlling computer devices. Here, we find such codes as the carriage return (CTRL-M, 0Dh 13d), line feed (CTRL-J, 0Ah, 10d), etc. They're quite useful, but not really meant to convey information to the humans

who use them.

The information for mortals is carried by the alphanumerics (really the letters, numbers, and punctuation) encoded in the range 32 through 127 in the decimal radix, which is the range 20 through 7E in the hexadecimal radix.

Ho hum, right?

Those apparently tedious facts turn out to be pretty interesting if you look at ASCII from the computer's viewpoint instead of your own.

The decimal and hexadecimal bases are conveniences for programmers, who can handle the manipulation of numbers better when the numbers are based on multiples of 10 (decimal) or 16 (hexadecimal), than on the multiples of 2 (binary) required to manipulate digital computers. Translate the ASCII chart from decimal or hexadecimal to the binary radix, however, and you see it ranges from 0000 0000 through 0111 1111.

In other words, ASCII uses only seven bits out of eight in each byte. ASCII disregards the leftmost, or "high-order," bit.

One result of setting that high-order bit—making it a "1" rather than leaving it "unset" as a "0"—is that you no longer have an ASCII file. You've jumped off the chart. What you have is what IBM designated as the "Extended ASCII Character Set," which they employed for display and print formatting.

That consequence has potentially practical implications. You can read a text file in ASCII by displaying it with MS-DOS's or CP/M's TYPE command, and you can import that ASCII file into most word processing programs for printing or editing. But TYPE a non-ASCII file, one which has all the high-order bits set, and what you see may very well be gibberish.

When you TYPE a non-ASCII file on an IBM-compatible computer—such as the H/Z159 or H/Z248, for example—you see the so-called "graphics characters," because that's the way they're interpreted. Text files with high-order bits set will also drive many word processing programs nuts; these programs use the high-order bit for internal purposes, which now are being violated.

So you can encrypt a file by simply violating the word processing program's expectations, encroaching on IBM's Extended ASCII Character Set, and setting the high-order bit on each byte of an ASCII file.

For a filter to do just that, take a look at OR.C in Listing 2. (This is almost the same program I used in developing a WordStar-to-ASCII filter early in the history of this column. But that was in a different context.)

OR.C reads an ASCII file as input, and writes an Extended ASCII file as output.

The output file has now been minimally encrypted. Casual snoops who know enough about computers to TYPE the file to the screen will see only garbage—but

```
/*
** OR.C -- sets high order bits of text files for simple encryption
** decrypt with AND
**
** version 1.00
**
** By Joseph Katz for "C NOTES" in SEXTANT
** Copyright 1987 by Joseph Katz
**
** usage: OR input.fil output.fil
*/

#include <stdio.h>

main(argc,argv)                 /* accept command-line args */
int argc;                       /* count args */
char *argv[];                   /* array of ptrs to args */
{
    int c, inname, outname;
    FILE *input, *output, *fopen();

    printf("OR -- bitwise inclusive OR filter by Joseph Katz\n");
    printf("Version 1.00\n");

    /*
    ** progressive error trapping
    */

    /* check for correct number of arguments */
    if(argc != 3) {
        printf("Specify input and output filenames\n");
        exit(1);                            /* error exit */
    }

    /* check for same name used as input and output */
    inname = strupr(argv[1]);   /* struprcase input name */
    outname = strupr(argv[2]);  /* struprcase output name */
    if(strcmp(inname, outname) == 0) { /* if the same */
        printf("Make input and output names different\n");
        exit(1);           /* error exit */

    }

    /* check for existing file with same name as output */
    if(fopen(argv[2],"r") != NULL) {
        printf("Overwrite existing file with same name as output (Y/N)?  ");
        if(toupper(bdos(1) &0xFF) != 'Y') { /* 'Y' or 'y' only */
            printf("Aborted by user\n");
            exit(1);                        /* error exit */
        }
    }

    /* open input if it exists */
    input=fopen(argv[1],"r");       /* open input */
    if(input==NULL) {               /* no such file */
        printf("Can't find the input file\n");
        exit(1);                        /* error exit */
    }

    /* open output and check for full disk or directory */
    output=fopen(argv[2],"w");      /* open output */
    if(output==NULL) {              /* disk or directory full */
        printf("Can't make the output file\n");
        fclose(input);                  /* guarantees the close */
        exit(1);                        /* error exit */
    }

    /*
    flow control and transformation
    */
    while( (c=getc(input) ) !=EOF ) { /* flow control */
        c |= 0x80;                      /* OR takes place here */
        fputc(c,output);
    }

    /*
    termination
    */
    fputc(0x1A,output);
    fclose(input);                  /* close files */
    fclose(output);
    printf("\nOR finished.\n");
    exit(0);
}
/*
end of OR.C
*/
```

Listing 2. OR.C source code for a filter to "minimally encrypt" an ordinary ASCII text file by setting to 1 the high bit of each byte. The lines shown shaded are unique to OR.C. They can be replaced with the lines shown in Figure 1 to produce AND.C, the decryption program.

FREE CATALOG AND APPLICATIONS GUIDE

AFFORDABLE ENGINEERING SOFTWARE
PC/MSDOS — Macintosh — CP/M

ACNAP — $125.00
AC Network Analysis Component Libraries, Macros, AUTO Execute

DCNAP — $95.00
DC Network Analysis. Component Libraries, Macros, AUTO Execute

SPP — $125.00
Signal Processing Program Macros, AUTO Execute, Windowing

PLOTPRO — $72.95
Scientific Graph Printing

PCPLOT3 — $95.00
High Resolution Graphics, Screen and Printer Graphics

LOCIPRO — $95.00
Root Locus Analysis Macros, AUTO Execute, Batch

ACTFIL — $95.00
Active Filter Design, Analysis, Synthesis

LCFIL — $95.00
LC Filter Design/Analysis

LSP — $95.00
Logic Circuit Design/Analysis

RIGHTWRITER — $95.00
Report Proofreader Program. Applies 2200 Rules of English

PDP — $95.00
Scientific Plotting Program for Pen Plotters

TEKCALC — $95.00
Programmable Scientific Calculator/Statistics Program

COMCALC — $72.95
Communications Budget Calculator and Spreadsheet Program

XFER — $95.00
Transfer Function Analysis and Circuit Synthesis

BV Engineering
Professional Software
(714) 781-0252
2200 Business Way, Suite 207, Riverside, CA 92501 U.S.A. TELEX-3089864

Circle #155 on Reader Service Card

. . . *Software Developers* . . .

develop your software to work with most of the desktop printers on the market!

DOT DAISY LASER COLOR JET

CARDINAL POINT INCORPORATED has published (3) three volumes of the "**PROGRAMMERS' HANDBOOK OF COMPUTER PRINTER COMMANDS . . .**" Each book contains the ESCAPE and Control Code sequences for most of the personal printers made by leading manufacturers both old and new. Each book is 5½" x 8½", spiral bound, and contains an easy to use table-format. Codes are listed in text-form with hex and decimal equivalents and detailed function descriptions. The information is not duplicated from one volume to the next.

1. Vol I - '84 ____ $37.95
2. Vol II - '85 ____ $26.95
3. 2 Vol Set (I & II) ____ $58.95
4. Vol III - '86 ____ $26.95
5. 3 Vol Set ____ $77.95
6. 2 Vol Set (II & III) $49.95

(Indiana residents add 5% sales tax. Please add $3 s/h (UPS reg.) per order. Quantity Orders or Dealer Inquiries may call collect. TO ORDER CALL: (812)-876-7811, (M–F, 9-5 EST) For more detailed information, write:

Cardinal Point INCORPORATED

P.O. Box 596-Dept-A, Ellettsville, IN 47429
We accept MC, VISA, MO, P.O.s–same day shpg.
Cks–allow 14 days. CODs– extra. UPS Blue–$5 shpg.

Circle #199 on Reader Service Card

Protect PC Hard Disk Data

PORTABLE TAPE BACKUP

For significant cost savings over dedicated units...

One PSI BP45+ can easily keep ten Z150/Z200's backed up at an average cost of under $232 per PC.

Price: $1100.00 with one interface card

$ 134.95 additional cards

Backup 20 MB in 4.6 minutes

TFA Associates
(703) 525-3633
3514 North Quebec St.
Arlington, VA 22207

Circle #126 on Reader Service Card

only if they're snooping on an IBM compatible. (At this point, though, let's not emphasize just *how* minimal this protection is.)

Inclusively ORing 1

The business in OR.C is done in this transformation: `c |= 0x80`. It's the equivalent of writing `c = c | 0x80`, only more terse, as befits a programming language named "C." Both statements perform a "bitwise inclusive OR" (abbreviated "OR") on every character that passes through the filter.

OR is one of the many operators that make C extraordinarily rich for low-level manipulations. By way of review, 1 OR 1 produces 1; 1 OR 0 produces 1; and 0 OR 0 produces 0.

ORing any number with 1, then, will always produce a 1. ORing a number with 0 simply gives you the original number. That means we can turn on (set) selected bits by ORing them with a byte (a "mask") that contains a 1 in each equivalent position in the mask, and zeroes in all other positions.

Because the difference between ASCII and Extended ASCII is that the former has 0 for the high-order bit while the

```
** AND.C -- unsets high order bits of text files for simple decryption
** of files encrypted with OR

** usage: AND input.fil output.fil

    printf("AND -- bitwise AND filter by Joseph Katz\n");

        c = c & Øx7F;                          /* AND takes place here */

    printf("\nAND finished.\n");

end of AND.C
```

Figure 1. Substitute the lines given here for the equivalent lines shown shaded in Listing 1. This will provide the source code to produce AND.C. AND.C will decrypt a file that has been "minimally" encrypted by OR.C. The decryption is simply a matter of clearing the high bits back to zero.

```
 Volume in drive A is DAVEY
 Directory of  A:\

CHPD     C        1743   5-25-86   4:17a
MAKESAFE C        2139   5-25-86   3:43p
MKPD     C        1715   5-25-86   3:45a
RMPD     C        1785   5-25-86   3:48a
CHPD     EXE      7270   5-25-86   4:19a
MKPD     EXE      7244   5-25-86   3:46a
RMPD     EXE      7306   5-25-86   3:52a
TRY▵          <DIR>      6-17-87   9:45a
        8 File(s)    327680 bytes free

A>
```

Figure 2. Directory listing of a floppy diskette with a private directory named TRY. Note the Delta sign with which the name ends; because of this, the subdirectory is inaccessible by ordinary means such as DIR or CHDIR. (See Listing 3 and Figures 3 and 4 for the code to make, change, and remove private subdirectories.)

latter has 1, what we have here is a piece of cake. The mask that sets high-order bits of ASCII files is 1000 0000 binary, which is 128 decimal or 80 hex. It is represented as 0x80 in the C programming language.

Very minimum encryption

So now you have an encrypted file. How safe is it from prying eyes? Well, let's put it this way: If you load my encrypted file into WordStar and take a few minutes to stop laughing, you'll immediately recognize why I call it "minimally encrypted." In other words, WordStar will be able to read the file plain as day.

The reason is that WordStar understands high-order bits and uses them for on-screen and print formatting. Even worse, MS-DOS on the Z100 and CP/M can simply ignore them; even TYPE can give you a perfectly readable file.

For CP/M and for the Z100, however, a lot depends on how your C compiler handles line endings. You may very well get lines, some of which are quite readable, while others start at the right edge of the screen and promptly disappear. (I'll leave it to you to examine the file to figure out what's going on.)

So my encryption technique is in fact minimal, which is what I said it would be. Among word processors, it's no protection against WordStar, NewWord 3, or anything else that can handle WordStar's document format.

Unfortunately, WordStar is rather popular. Sigh.

Still, OR is pretty good if what you want is minimal encryption for minimum security on an IBM compatible.

That may be rather more minimal than you're willing to accept, of course. If so, take heart. All is not lost.

Exclusively ORing 1

If *inclusively* ORing 1 predictably churns out 1, the *exclusive* OR (XOR) is more imaginative. XOR 1 will always reverse the other number: 1 XOR 1 produces 0, and 1 XOR 0 produces 1. (And, for completeness, 0 XOR 0 produces 0.)

XORing 0111 1111 binary, then, should produce a file of ASCII characters whose values are the binary complement of the original. And all the high-order bits will be unchanged. The number 0111 1111 binary is 127 decimal, or 0x7F. So, our transformation would be handled by `c ^= 0x7F`.

Suitably XORed, the letter A (0100 0001 binary, 101, or 0x41) will become the greater-than sign (>) (0011 1110, 76, 0x3E). And just in case simple letter transposition doesn't create enough confusion, line feeds should change places with lowercase u's; and even better, a lowercase e should produce a CTRL-Z—which most word processors will recognize as the end-of-file marker.

All this, however, is quite beyond my needs. I am assuming I need only to annoy novice snoopers enough to encourage their departure to more promising files.

And I need something that is easy to circumvent in case I forget how to decrypt the file. I leave it to you to experiment with XOR (and with NOT, too, for that matter). For ease and simplicity, though, a virtue of XOR is that the same operation that encrypts a file will also decrypt it.

Decrypting with AND.C

Decryption? Oh yes, I almost forgot. OR has to be decrypted. The opposite of ORing 1 is to AND 0. AND.C is the decryption program. (AND.C is provided in the form of a kit, consisting of Listing 2 plus the alterations specified in Figure 1.)

In OR.C (Listing 2), find the transformation `c |= 0x80`. This will have to be replaced by a suitable OR statement. In Figure 1, you'll see the transformation `c = c & 0x7F`. As we had with OR, we have a choice between a shorter form of the AND statement (`c &= 0x7F`) and a longer form. Just for variety, I chose to use the long form in AND.C. Both statements perform a bitwise AND on every character that passes through the filter.

As far as the arithmetic is concerned, we once again have a piece of cake. The mask that unsets high-order bits of ASCII files is (as it would be with XOR) 0111 1111 binary (127, or 0x7F).

So, the thing to do if you have a minimally sensitive file you have to leave around a minimally attended computer is to minimally encrypt it by running it through OR.C to produce an extended ASCII file. Then, when you want to read or edit the text, run the extended ASCII file through AND.C to produce an ASCII file.

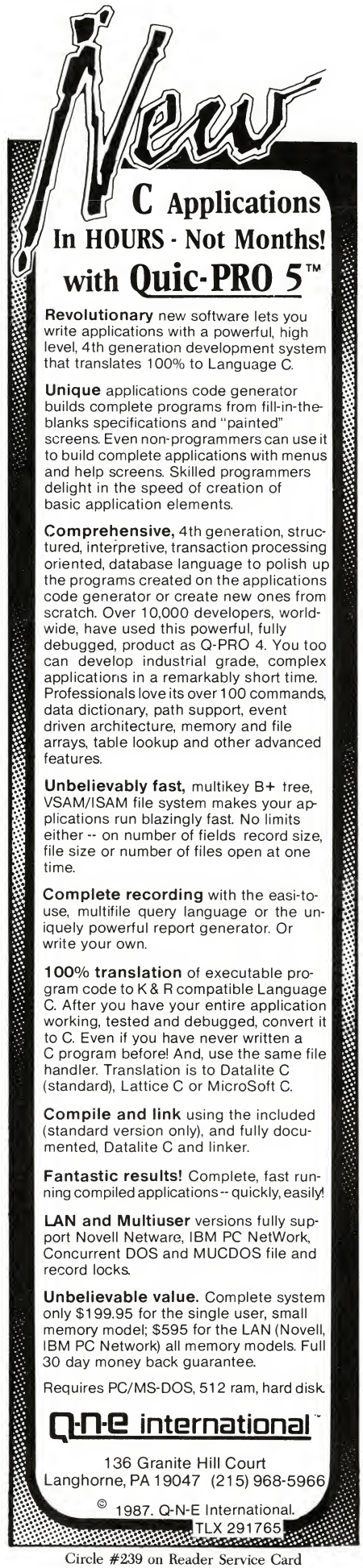
For somewhat less minimal protection, you can play with XOR.

The David Copperfield Scam

I'm fond of David Copperfield. Both of them. He of the Charles Dickens novel managed to prevail in a grotesque world. And he of the contemporary stage not only made a Boeing 747 disappear, but also made it reappear.

Both of these Davids together strike me as an appropriate icon for three programs that form tools for making, changing to, and removing private directories in MS-DOS version 2 or above: MKPDIR, CHPDIR, and RMPDIR. (MS-DOS version 1 and Z-DOS do not support subdirectories, so they do not support private directories.)

They're "private" directories and not "secret" directories because their existence is revealed immediately by an ordinary DIR listing. Look at Figure 2 for the DIR listing of a floppy diskette with a private directory named TRY. On an IBM compatible, the way you can tell it's a private directory is the Delta sign with which that directory name ends. (On a


New
C Applications
In HOURS - Not Months!
with Quic-PRO 5™
Revolutionary new software lets you write applications with a powerful, high level, 4th generation development system that translates 100% to Language C.
Unique applications code generator builds complete programs from fill-in-the-blanks specifications and "painted" screens. Even non-programmers can use it to build complete applications with menus and help screens. Skilled programmers delight in the speed of creation of basic application elements.
Comprehensive, 4th generation, structured, interpretive, transaction processing oriented, database language to polish up the programs created on the applications code generator or create new ones from scratch. Over 10,000 developers, worldwide, have used this powerful, fully debugged, product as Q-PRO 4. You too can develop industrial grade, complex applications in a remarkably short time. Professionals love its over 100 commands, data dictionary, path support, event driven architecture, memory and file arrays, table lookup and other advanced features.
Unbelievably fast, multikey B+ tree, VSAM/ISAM file system makes your applications run blazingly fast. No limits either -- on number of fields record size, file size or number of files open at one time.
Complete recording with the easi-to-use, multifile query language or the uniquely powerful report generator. Or write your own.
100% translation of executable program code to K & R compatible Language C. After you have your entire application working, tested and debugged, convert it to C. Even if you have never written a C program before! And, use the same file handler. Translation is to Datalite C (standard), Lattice C or MicroSoft C.
Compile and link using the included (standard version only), and fully documented, Datalite C and linker.
Fantastic results! Complete, fast running compiled applications -- quickly, easily!
LAN and Multiuser versions fully support Novell Netware, IBM PC NetWork, Concurrent DOS and MUCDOS file and record locks.
Unbelievable value. Complete system only $199.95 for the single user, small memory model; $595 for the LAN (Novell, IBM PC Network) all memory models. Full 30 day money back guarantee.
Requires PC/MS-DOS, 512 ram, hard disk.
Q-N-E international
136 Granite Hill Court
Langhorne, PA 19047 (215) 968-5966
© 1987. Q-N-E International.
TLX 291765
Circle #239 on Reader Service Card

SOLARSIM™

by
James Tursa

The Solar System Simulation Program

SOLARSIM is a dynamic 3-D color graphics simulation of our solar system and nearby star systems. It simulates the planets, 250 asteroids and comets (including Halley's), and over 800 stars, nebulae and galaxies (you can add more!) View and identify the stars and solar system from any point on Earth or nearly any point in space, and at any specified time or date. Great for stellar navigation, tracking comets and planets, and learning the positions and shapes of the constellations. Printouts! Comes with hi-quality 50-page manual.

ONLY $29.95!

Available for IBM PC/XT/PCjr/AT and compatibles, Zenith Z-100, and TI Pro.

System Requirements:
128K RAM & Color/Graphics Adapter (IBM)
192K RAM (Z-100)
256K RAM (TI Pro)
DOS 2 or later (except Z-100)

Send check, money order or COD orders to INTERSTEL, P.O. Box 57825, Webster, TX 77598, (713) 486-4163. Please add $2 for shipping. In Texas, add sales tax.

Credit card orders only:
(800) 622-4070 (Nat'l)
(800) 942-7317 (ILL)

interstel corporation

Circle #137 on Reader Service Card

Need a PAL® For Your Z-150?

MegaRAM-150™ package allows five banks of 256K RAMs to be installed on standard memory card for over a megabyte of total memory. Resulting memory organized as 640K/704K main and 512K software controlled overlay. Simple installation requires no soldering. Includes software Device Driver to use overlay memory as 512K RAM disk. ***$49.95 each ppd.***

ZP640 PLUS replacement for U455 PAL® allows two banks of 256K RAMs and two or three banks of 64K RAMs to be installed on standard memory board for 640K or 704K total memory (size selected by J401 jumper). ***$24.95 each ppd.***

COM3 package changes COM2 serial port to new port address (3E8H) and thus allows total of three serial ports. COM2 assumed to be on internal modem card or similar device. Printer driver software included. ***$39.95 ppd.***

FBE

FBE Research Company, Inc.
P.O. Box 68234
Seattle, WA 98168
(206) 246-9815

PAL® is a trademark of Monolithic Memories Inc.
VISA and MasterCard Accepted.

Circle #102 on Reader Service Card

Z100, the trailing Delta will not appear on the screen.)

Look at an ASCII chart and you'll see that Delta is the graphics representation, on IBM-compatible computers, of the DEL code, 0x7F. The real name of this private directory, therefore, is not TRY, but TRY plus 0x7F. It's that trailing delete code that makes the directory private.

You'll understand why that's so if you try making your own private directory right now. Use a blank formatted diskette, please, and not your hard disk or a diskette containing valuable data. You don't want to lose anything if you turn out to be more inventive than I can anticipate.

I wouldn't spend too much time fooling around, though, because there's no known way to enter the DEL code from the keyboard. So you can't use MS-DOS's MD (or MKDIR) command to make such a directory, nor can you use MS-DOS's CD (or CHDIR) command to change to there from the current directory, nor can you use MS-DOS's RM (or RMDIR) command to remove that directory. You can't get a directory much more private than that.

Use C's equivalent of MD, CD, and RM

Here again, one basic structure is modified slightly to produce three programs. MKPDIR.C is given in Listing 3. The changes needed to produce CHPDIR.C are indicated in Figure 3, and those for RMPDIR.C are given in Figure 4. All three programs use library functions (included with most current MS-DOS compilers) that access and are the equivalent of MS-DOS's MD, CD, and RM functions.

All three programs prompt you for the private directory's base name (the name

```
/*
** MKPDIR.C -- make a private directory
**
** version 1.00
** By Joseph Katz for "C Notes" in SEXTANT
** Copyright 1987 by Joseph Katz
**
** one or three programs in a set to manage 'private' directories:
**      MKPDIR -- makes a private directory <--
**      CHPD -- changes to a private directory
**      RMPD -- removes a private directory
**
** strupr() in Microsoft C uppercases a string
*/

#include <direct.h>          /* dir functions in Microsoft C 4.0 */

char tempname[7];       /* array for name prompted from user  */
char filename[9];       /* array for name used in dir functs  */
char *prefix = "\\";    /* backslash made an escape character */
char suffix = '\177';   /* DEL can't be typed from keyboard   */

main()
{
    printf("MKPDIR -- Makes a private directory\n");
    printf("Copyright 1987 by Joseph Katz\n\n");
    strcpy(filename,prefix);
    printf("Press RETURN to quit. Or enter a directory name:  ");
    gets( tempname );
    if ( strlen(tempname) == 0 )
    {
        printf("\nMKPDIR terminated by user\n");
        exit(0);
    }

    strncat(filename,tempname,7); /* don't overflow array */

    if ( strlen(tempname) > 7 )
        printf("\nOverlong directory name truncated to %s\n",strupr(filename));

    strcat(filename,&suffix);

    if( mkdir(filename) != 0 )
    {
        printf("\nCould not make the private directory\n");
        printf("Invalid characters input or private directory exists\n");
        exit(1);
    }
    printf("Made the private directory: %s\n",strupr(filename));
    exit(0);
}
/* end of MKPDIR.C */
```

Listing 3. MKPDIR.C, the C source code for a program to make a "private" subdirectory. It will attach a trailing Delta (7F hexadecimal) to the end of the subdirectory name, rendering it unreadable by ordinary means, such as DIR or CHDIR. The shaded portions are unique to MKPDIR. See Figures 3 and 4 for replacement lines that will change the program into CHPDIR and RMPDIR, respectively.

```
** CHPDIR.C -- change to a private directory

    printf("CHPDIR -- Changes to a private directory\n");

        printf("\nCHPDIR terminated by user\n");

    if( chdir(filename) != 0 )
    {
        printf("\nCould not change to the private directory:\n");
        printf("Invalid characters input or private directory does not exist\n");

/* end of CHPDIR.C */
```

Figure 3. The lines of C code given here may be substituted for the equivalent shaded portions in Listing 3. This will give you the source code to produce the program CHPDIR, for changing to a "private" directory.

```
**  RMPDIR.C -- remove a private directory

    printf("RMPDIR -- Removes a private directory\n");

        printf("\nRMPDIR terminated by user\n");

    if( rmdir(filename) != 0 )
    {
        printf("\nCould not remove the private directory\n");
        printf("Invalid characters input, private directory does not exist,\n");
        printf("or private directory not empty\n");

/* end of RMPDIR.C */
```

Figure 4. The lines of C code given here may be substituted for the equivalent lines shown shaded in Listing 3. This will give you the source code to produce the program RMPDIR, for removing a "private" directory.

without the trailing delete character). They will assemble that into an array that leads with a backslash (as required by MS-DOS) and trails with the delete character (as required to make a private directory); then they pass that array to the equivalent MS-DOS function.

The drill is simple. First, you use MKPDIR to create a private directory. Next, you use CHPDIR to change to that private directory whenever you want to create, see, add, edit, or remove any files in that private directory.

I don't know of any application programs with CD functions that support changing to a private directory, so we seem to have only two choices of when to make the change. First, you can use CHPDIR to change to the private directory before running the application program. Alternatively, if the application program allows you to call other MS-DOS applications, you can do so, run CHPDIR, and exit back to the main application program.

At last, when you no longer need the private directory, you use RMPDIR to remove it—after first moving or deleting the files within it, of course.

Although it all sounds mysterious and a little shady, there's nothing inherently dangerous in either the theory or practice of private directories.

What you *don't* want to do, though, is create a private directory and do something silly like misplace CHPDIR or RMPDIR. △

NEW RELEASE 1.6

CPA II

Personal Accounting for IBM PC Compatible Systems

A popular system now made even better! All the features of our earlier system, with many new ones. But, best of all. . .

NEW Pricing. . . Now only $59.00
NEW Features and Capabilities
NEW Hierarchical Menus
NEW Easy Set-up Procedure
NEW On-line Help Screens
NEW Mortgage, Loan, Investment and Depreciation Utility

Any number of Vendor, Cash and Checking accounts desired. User-specified Expense and Income categories. Check printing, auto-posting, spreadsheets, bar graphs, tax deductions, accounts-coming-due, budgets, and many other detailed reports. Auto-checkbook reconciliation. Easy user-command entry. Full edit capabilities. Fast and efficient. Can be used with any printer for all reports and bar graphs. Not copy-protected.

Requires 256K RAM, color video, RGB monitor, at least 2 disk drives (2 floppies, or 1 hard disk and 1 floppy), MS-DOS 2.1 or greater. Monochrome version to be announced.

R-D-S REICHERT DIGITAL SYSTEMS
29 BLAZIER RD. WARREN, N.J. 07060 (201) 469-3854

Circle #151 on Reader Service Card

We couldn't have said it better ourselves...

* Your update policy and newsletter are the best I've seen. M. Frederick, Omaha, NE
* Beautiful and elegant in simplicity! S. Greenberg, Douglaston, NY
* The software which I have purchased from Paul F. Herman Inc., and the support, has been excellent. J.M. Hall, San Diego, CA
* Dollar for dollar, Paul F. Herman software consistently proves to be a best buy. The support is far beyond what might be expected for the price. It reminds one of a users' group attitude. D.C. Johanson, Jamison, PA
* Paul Herman's "DOODLER Graphics Package" provides me with every capability I need to develop and print graphics of the highest quality. S. Revere, Trenton, NJ
* Paul Herman seems to be filling the gaps in Z-100 graphics that Heath/Zenith didn't. J. White, Columbus, OH
* A quality product for the Z-100. E. Sevin, Bethesda, MD
* I don't know how I would do the work I do without DOODLER. I recommend it to my customers. T.W. Flynn, Apollo Beach, FL
* DOODLER-V is the best Z-100 graphics program I have purchased - the only one I use. R.W. Hilton, Las Vega, NV
* The best graphics package for the Z-100. Simple as that! J. Fiegel, Gretna, LA
* Quality software is still being developed for the Z-100 (poor orphan) and P.F. Herman is a leader. R.A. Tilden Jr., Somerville, MA
* I've never found such friendly support in both technical and business questions like from P.F.H. J. Poellmann, W. Germany

PAUL F. HERMAN Inc.

Software Graphics Tools
3620 Amazon Drive
New Port Richey, FL 33553

Circle #172 on Reader Service Card

Z100 Notebook

William N. Locke

Enable

ShowOff

Enable

I have come across a truly fine software package available for both the Z100 and Heath/Zenith's IBM-compatible computers running version 2 or greater of the Microsoft Disk Operating System (MS-DOS). This package is Enable, a product of The Software Group of Ballston Lake, New York.

Enable is a piece of integrated software. That is, it gives you a word processor, a spreadsheet, a data base management system (DBMS), and a modem-communications module that all work together as one program. The usual problem with integrated packages, of course, is that the designers have to make a lot of compromises to get the individual modules to work together. Therefore, the word processor or whatnot is usually not as good as you could get in a stand-alone product. Unlike many integrated software packages, however, Enable's individual modules could be strong contenders on their own.

Enable includes an extensive windowing package that allows you to move data back and forth between modules. It's as easy as an ordinary block move or cut-and-paste between sections of one document. Using windows lets you look at different sections of one file and different files in any module. I found it most convenient to have a window occupy the entire screen as I switched between them. If I'd wanted, however, I could have shrunk any of the windows so that a smaller portion of its file appeared on the screen. Any number of windows can be on the screen at the same time.

Enable is both command and menu driven. You can either move the cursor to choices in a menu, or type in the appropriate letter at the command line. You use the same function keys, commands, and menu structures to perform the same tasks throughout Enable's various modules.

Since you may do a particular job over and over again, Enable allows you to store series of keystrokes or commands as macros. You can set up a key to execute the series of actions; Enable will store it on disk, so it's available until you want to redefine the key. The macro facility is part of the Enable Master Control Module (MCM), so, as with everything else, your macros can move freely between modules.

Alternatively, Enable provides you with a macro command language—in effect, a small programming language. You can write your own macros, and these macros can call other macros as subroutines.

Enable also includes a menu generator, so you can make up customized menus to automate particular jobs. This could come in handy for home use, but I suspect its major virtue would be in an office, where relatively unskilled users may have to be given a wide variety of tasks, or where tasks may change frequently. You need just one user skilled enough to design the task and generate the menus.

And in case you think there's some program of yours that could make Enable just a little bit better, there's also a high-level language interface. Enable provides a device driver that allows it to communicate with your program. Just choose "DOS" on the main menu, and run your program. (Your CONFIG.SYS file has to include a DEVICE = line to tell MS-DOS the driver is present.)

If macros, menu generation, or a high-level language interface seem to be a bit beyond your needs, the important thing to remember is that you don't have to use them to perform your customary operations. But it's nice to know they're there if you want to push the system to its fullest.

One limitation is that Enable will not work with any device connected to the Z100's *J1* serial port. That won't be any inconvenience if you use a parallel printer.

A steal

I will address each of the modules, but first a comment on the price. The software is list priced at $695 for the IBM-compatible computers. This is certainly a sizable sum of cash, but the range and quality of the modules make Enable well worth that price.

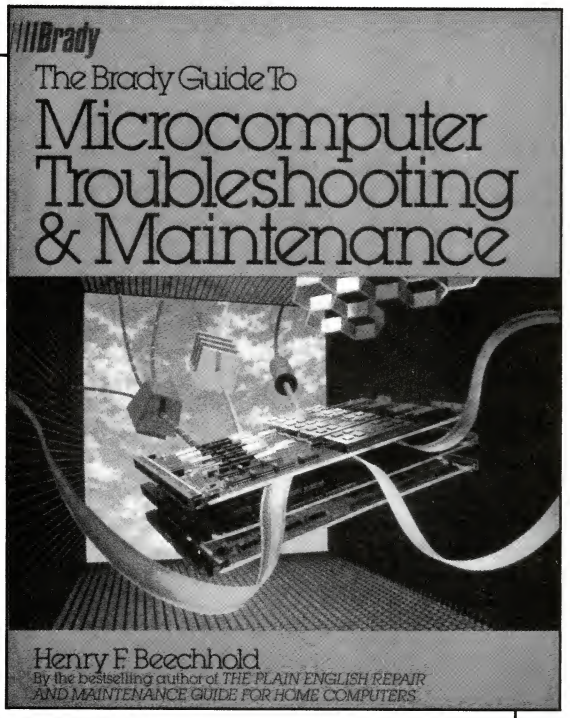
The Z100 owner, however, gets a deal. For the Z100, this package is available from The Software Group for $195. That's it—less than a third the IBM-compatible price. If ever an item was a bargain at $195, the Enable package is one. The people at The Software Group told me that they recently developed the Z100 version to support the large number of Z100s in the military. I have tried the Z100 version, and it works!

The word processor

Enable's word processing module is a full-featured word processor. It includes a full range of standard commands for creating, editing, and printing files in finished form. I found that the commands were easy to understand. There are certainly many of them, but they are generally duplicated by menu options that allow

"The best hands-on cure for computer frustration."

Erik Sandberg-Diment
New York Times syndicated columnist


Brady
The Brady Guide To
Microcomputer Troubleshooting & Maintenance
Henry F Beechhold
By the bestselling author of THE PLAIN ENGLISH REPAIR AND MAINTENANCE GUIDE FOR HOME COMPUTERS

The Brady Guide To

Microcomputer Troubleshooting & Maintenance

Finally! A "fix-it" book that computer novices can use to diagnose problems with their machines—written by Henry Beechhold, an experienced Heath/Zenith user.

Beechhold, who currently uses a '150, '100, and '89 (with seven disk drives!), wrote this book for the nontechnically oriented. With a clear and concise style, he explains basic computer operations with tips for improving your computer's capabilities; outlines the proper tools and equipment you should use; and includes a chapter on the care, repair, and maintenance of your software.

Here's what this book will do for you:

- familiarize you with the insides of your computer
- introduce you to the basics of computer logic and electronics
- provide you with the conceptual tools for, and practical techniques of, simple troubleshooting and routine maintenance
- encourage you to hand over equipment exhibiting complex malfunctions to a professional repair facility
- help you understand what you can expect from professional technical service
- increase your vocabulary of "techno-jargon" in a painless way

You don't have to be a computer whiz to get everything you need from this book. It's all laid out in a personable, nontechnical style that makes it a good read as well as a valuable resource.

To order your copy, fill out the coupon at the right and return it to the address shown. Do it today!

The Brady Guide To Microcomputer Troubleshooting & Maintenance
$17.95
325 Pages
Published in March 1987

I want *The Brady Guide To Microcomputer Troubleshooting & Maintenance*!

Send me _____ copies @ $17.95 each (please add $2.50 shipping and handling *per order* in the U.S./Canada, and $4.00 *per book* overseas).

☐ My payment is enclosed (checks must be in U.S. dollars, payable on a U.S. bank).

☐ Charge my Visa ___ MasterCard

Card # _____ Expires _____

Name _____

Address _____

_____

_____

Sextant Publishing Company, Dept. S30, 716 E Street S.E., Washington, DC 20003

Index to Advertisers

Reader Service #		Page #
	Alpha Services	
127	'286 card for IBM compatibles.	33
	ANAPRO Corporation	
*	'89 enhancements.	63
	Aspen Systems	
149	Subroutine package and editor.	43
	A.U. Software	
130	Examination software.	65
	Travis J. Barfield, Jr.	
234	Z100 color graphics software.	48
	Dante Bencivengo	
193	Z150-160 hardware enhancements.	43
	Bersearch Information Services	
223	HERO macros and interface to Apple.	74
	Buss	
107	Directory of suppliers.	30
107	Heath/Zenith news.	47
	BV Engineering	
155	Engineering software.	56
	Cambridge Computer Corp.	
197	Honeywell terminal emulation for Z100, Z150.	27
	Cardinal Point Inc.	
199	Printer command references.	56
	CB Sftwr	
231	MS-DOS multi-file search-and-replace utility.	49
	C.D.R. Systems	
108	Hardware for H/Z100.	35
	Cometsoft Technology	
162	Chess for Z100.	48
	Computer Options Unlimited	
191	Laptop computers and accessories.	21
	Conversational Computer Systems	
213	Turbo Pascal utilities.	45
	Al Davis	
122	Hardware.	65
	Disk Software Inc.	
158	Geometric routines for Turbo Pascal.	24
	Domino Computer Services Inc.	
232	Hardware and software.	67
	Ecosoft Inc.	
215	C programming software and publications.	53
	ETTS	
148	Graphics software for H/Z100.	24
	FBE Research Company	
116	H/Z89 hardware enhancements.	37
102	H/Z150 enhancements.	58
142	H/Z100 hardware enhancements.	77

Reader Service #		Page #
	First Capitol Computer	
206	Computer systems.	17
	Hersey Micro Consulting	
168	Console utility for H/Z150-200.	13
	Hogware	
144	Z100 graphics program.	14
	Hoyle & Hoyle Software	
113	Data base management system.	19
	Intercontinental Microsystems	
106	Network for Z100, Z150.	5
	Interstel Corporation	
137	Solar system simulation software.	58
	Intuitive Logic	
103	H/Z89, H/Z100 software.	19
	Jay Gold Software	
120	Home finance system.	77
	KEA Systems	
171	Enhancements for Z138, '148, '151, '158, '161.	18
175	VT220 emulation and keyboard.	25
	Kres Engineering	
194	Dual-speed module for H/Z89-90.	74
	Laclede Printing Company	
100	Computer forms.	28
	Lightek	
177	Z100 enhancements.	67
	Lindley Systems	
118	H/Z100 hard drives.	75
	Magnolia Microsystems	
134	'89 enhancements.	28
	Matcomm	
192	Supplies, disks.	45
	Micronics Technology	
207	Winchester for H/Z89.	77
	Newline Software	
145	Software for Z100, Z150 series.	30a
	Omni Data Systems	
201	IBM/AT-compatible Z-200 PC.	33
	Paul F. Herman	
172	Graphics software for H/Z100, H/Z150.	59
	Payload Computer Systems	
147	Hardware, software, supplies.	50-51
	Powerline Systems	
225	Records management for MS-DOS.	43
	Q-N-E International	
239	C development system.	57
	RAM Technology	
129	Memory enhancement for H/Z150.	6-7
	Hubert Reeder	
242	Text editor for IBM compatibles.	49
	Reichert Digital Systems	
151	Accounting software for Z150.	59

Reader Service #		Page #
	Scottie Systems	
111	IBM compatibility for H/Z100.	18
	The SEBHC Journal	
138	Publication covering H8, H88, H/Z89-90.	28
	Secured Computer Systems	
157	H/Z89-90 hardware enhancements.	20
	Sextant	
*	Subscriptions.	15
	Sextant Publishing Co.	
*	Binder interface kits.	21
*	Book on computer maintenance.	61
*	Books on MS-DOS and GW-BASIC.	Back cover
	Sirius Software	
212	Hardware, games.	67
	S & K Technology	
230	Word processor, spelling checkers.	33
	Skycastle Computer Products	
218	Printer enhancement software.	29
	SoftNet Communication Inc.	
132	Local area network for Z100, Z150.	49
	The Software Group	
226	Z100 integrated software.	38-39
	Software Wizardry	
204	Speed enhancement for H/Z151-161.	41
	Spectre Technologies, Inc.	
198	CP/M & MS-DOS software.	3
	Technical Micro Systems	
173	Desktop utility software for H8 and H/Z89.	4, 37
	Technology Marketing	
182	Weather monitoring hardware, software for IBM compatibles.	21
	TFA Associates	
126	Portable tape backup.	56
	UCI Corporation	
196	Hardware for '100 and '148.	9
180	Network for Z100 and IBM compatibles.	23
	Wong's Advanced Technologies, Inc.	
227	Printers, monitors, hard disks, tape drives, hardware enhancements.	70-72
	Zeducorp	
236	Local area network.	25
	Zimbazi Products	
216	Z100 programming tools for Turbo Pascal.	65
	Zyzx Inc.	
237	HERO 1 development system.	20

* Contact advertiser directly.

Please refer to the key at the right when completing the article evaluation form on the attached Reader Service Card above. By letting us know how interesting and/or helpful you found each feature in this issue of *Sextant*, you will help us choose the best articles for you in the future.

1. Peggy Wallace, **All in the Family: Ten Years of Heath/Zenith Computers**, p. 10.
2. Peggy Wallace, **The Good, the Bad, and the Uncertain**, p. 16.
3. Wayne Rash, Jr., **Exploring Zenith's Software Update Policy**, p. 22.
4. William N. Locke, **The Z100's Fifth Birthday: Interviews and Overviews**, p. 26.
5. Kirt Alan Winter, **The Z248: One User's Impressions**, p. 31.
6. Walter J. Janowski, **The Eight-Bit World**, p. 34.
7. Ben R. Ezzell, **Perspectives on Pascal**, p. 40.
8. William M. Adney, **Editing MS-DOS Command Lines—Easily**, p. 46.
9. Joseph Katz, **C Notes**, p. 52.
10. William N. Locke, **Z100 Notebook**, p. 60.
11. Doris Wagner and Al Heigl, **Computer Self Defense: Getting the Upper Hand**, p. 66.

Name _____

Address _____

_____

City _____

State _____ ZIP _____

For further information from specific advertisers, refer to index on page 62 and circle number(s) below.

100	101	102	103	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127	128	129
130	131	132	133	134	135	136	137	138	139
140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169
170	171	172	173	174	175	176	177	178	179
180	181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209
210	211	212	213	214	215	216	217	218	219
220	221	222	223	224	225	226	227	228	229
230	231	232	233	234	235	236	237	238	239
240	241	242	243	244	245	246	247	248	249

Reader Service Card
September-October 1987

Expires December 15, 1987

Please check the boxes that apply to you.

A. ☐ Do you own/use **8-bit** machines (H/Z89-90, H8, etc.)?

B. ☐ Do you own/use **Z100 series** machines?

C. ☐ Do you own/use **IBM-compatible** machines (Z150, Z171, Z248, etc.)?

Please rate the articles in this issue for interest and helpfulness, using the key on page 62.

1	2	3	4	5	6	7	8	9	10	11	
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Excellent
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Good
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fair
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Poor
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Didn't read

Comments _____

_____

_____

_____

_____

62a1

Name _____

Address _____

_____

City _____

State _____ ZIP _____

For further information from specific advertisers, refer to index on page 62 and circle number(s) below.

100	101	102	103	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127	128	129
130	131	132	133	134	135	136	137	138	139
140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169
170	171	172	173	174	175	176	177	178	179
180	181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209
210	211	212	213	214	215	216	217	218	219
220	221	222	223	224	225	226	227	228	229
230	231	232	233	234	235	236	237	238	239
240	241	242	243	244	245	246	247	248	249

Reader Service Card
September-October 1987

Expires December 15, 1987

Please check the boxes that apply to you.

A. ☐ Do you own/use **8-bit** machines (H/Z89-90, H8, etc.)?

B. ☐ Do you own/use **Z100 series** machines?

C. ☐ Do you own/use **IBM-compatible** machines (Z150, Z171, Z248, etc.)?

Please rate the articles in this issue for interest and helpfulness, using the key on page 62.

1	2	3	4	5	6	7	8	9	10	11	
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Excellent
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Good
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fair
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Poor
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Didn't read

Comments _____

_____

_____

_____

_____

62a2

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA

POSTAGE WILL BE PAID BY ADDRESSEE

Sextant Reader Service
P.O. Box 13558
Philadelphia, PA 19101

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA

POSTAGE WILL BE PAID BY ADDRESSEE

Sextant Reader Service
P.O. Box 13558
Philadelphia, PA 19101

beginners to step their way through.

I was particularly pleased to find that block commands could act on *columns* of information rather than simply on vertical sections of text. This allows data columns to be moved horizontally, or to other sections of a document.

A host of useful commands are supported. These include: the ability to make multiple-column documents, similar to magazine format; the ability to call for underlining, italics, etc.; creation of a full range of headers, footers, and footnotes; index and table of contents creation; a built-in calculator; block indenting of text; and justification.

You can create varying character fonts whose screen appearance mimics your printer's output options. Graphics produced by the spreadsheet and data base may be mixed with text. (Once again, it's as easy as an ordinary block move.)

The people at The Software Group have been particularly careful to allow you to read and create files compatible with other well known word processors on the market. Supported programs include Volkswriter, Easywriter, WordStar, MultiMate, and Peachtext. And Enable can deal with the Document Content Architecture (DCA) used by some other programs.

When Enable was adapted to the Z100, the designers had to make some choices in mapping the Z100 keys to match the keys on IBM-compatible computers. I was not completely pleased with the choices that were made.

Basically, the unshifted numeric-keypad keys produce numbers—convenient for spreadsheets but not for word processors. You have to use the Shift key to get the keypad to produce cursor-control and page-movement commands. For instance, you have to press SHIFT-9 to get a PAGEUP operation, and SHIFT-1 to go to the bottom of the screen. (I fixed this using the KEYMAP program given in the "Z100 Notebook," *Sextant* #27, March-April 1987. MS-DOS's font editor, FONT, could have been used equally well for these modifications.)

Enable's word processor is accompanied by a fast spelling checker, which may be called from the word processor and run on the text being edited. The spelling checker is the sort that not only tells you that you have incorrectly spelled a word, but goes on to propose words that are similar to your spelling.

If the correct spelling happens to be in the proposed list, you select it and Enable will automatically replace the incorrect word. (If there were no spelling checkers in this world, I would not do nearly as much writing. They save a considerable amount of dictionary time.)

Finally, the word processor includes a mail-merge feature. This feature is actually a combined use of the word processor and the data base manager. It allows you to combine a list of names and addresses with a form letter, so you can mail personalized letters. Now at last I have the ability to send out a mailing that can fool casual readers into thinking that the letters were created individually.

The spreadsheet module

The spreadsheet module is another strong section of the overall Enable package. It performs all the usual spreadsheet functions, such as allowing you to assign formulas to cells, and give names to columns and rows. It lets you move and copy columns, and provides numerous standard functions for use in the formulas. Spreadsheets may be merged, and data will be automatically recalculated when you change any cell whose entry impacts other cells.

There are also many advanced features. The spreadsheet can be split into two sections on the screen; one or both can be scrolled, allowing comparison of widely separated sections of the spreadsheet.

Rows and columns may be sorted using a sort algorithm that can accept both a primary and a secondary key on which to base sorting. Row and column labels, by the way, may include underlining, italics, and boldface characters; all of these are supported on the Z100.

The spreadsheet used for Enable may have in excess of 65,000 cells. You can get as many as 511 columns (with 127 rows) and, limiting yourself to 15 columns, as many as 4,095 rows. Within those limits, cells may be arranged with any number of rows and columns.

Cells and ranges of cells may be given names, as well as the standard cell addresses. As an example, a cell such as A1 might be given the name "Pi" or "income." This name can later be referred to in a formula. As with the word processing module, the spreadsheet supports an extensive macro capability, including special commands for moving about the spreadsheet and performing actions under specified conditions.

Enable has a powerful set of on-screen graphing features for plotting spreadsheet data. The graphs include bar charts, line charts, pie charts, and stock-market charts. As many as eight data sets may be plotted on a single graph. The bar charts may either stack these data sets or plot them next to each other in groups. (The pie charts may be either round or exploded.)

If the computer has an 8087 math co-processor, Enable will use it for floating-point math, speeding up all calculation. Enable automatically senses the presence of the 8087, so the user need not even know that it is there.

The Software Group has allowed for compatibility with several other spreadsheet programs, including Lotus 1-2-3, Symphony, SuperCalc 3, and Multiplan. Enable can also read from or write to files in ordinary ASCII text format. And it is possible to import data into the spreadsheet directly from Enable's data base management system.

If an individual needs a powerful

ANALYTICAL PRODUCTS — HARDWARE & SOFTWARE FOR HEATH/ZENITH COMPUTERS

4MHz mod for H89 ..... $45
HDOS software ..... $ 5

6MHz mod for H89 ..... $59

Automatic Key Repeat for H19/H89
REP3K Kit $35
REP3A Assembled $45

H89 Real Time Clock — with battery
TIM2K Kit $65
TIM2A Assembled $75
Software on disk CP/M or HDOS $10

EMULATE — H89 breaks the format barrier!
Read, write and format over 50 disk formats $59

CPC - CP/M to PCDOS transfer utility for H89/H8 ..... $35

DateStamper $45

ZCPR3 — bootable Z-System for H89/H8
Includes ZRDOS+ and book $98

Smart Checkbook — personal finance
CP/M 80 or MSDOS $89

C/80 Compiler $45

INVENTORY CLEARANCE SALE
Limited to stock on hand

NewWord — the better word processor
Includes WORD plus by Oasis! $69
CP/M 80 ..... ~~$145~~

Jupiter 2 — MSDOS db program $79

Turbo Pascal — CP/M 80 or PCDOS .. ~~$59~~ $45

Turbo Toolbox — CP/M 80 or MSDOS . ~~$45~~ $39

Media Master ..... ~~$36~~ $25

SuperSort — original sorting program
CP/M 80 or MSDOS ..... ~~$119~~ $85

CDR Super RAM 89
Main board w/512K RAM ..... ~~$239~~ $199
System w/Megabyte RAM ..... ~~$369~~ $295
Clock option ..... ~~$45~~ $29

Terms: Check or Money Order — Visa, M/C — C.O.D.
Add $4 per order for shipping and handling
California residents add 6% tax

805/688-0826

ANAPRO CORPORATION
213 Teri Sue Lane
Buellton, CA 93427

spreadsheet, I suspect that the full cost of the Enable package for the Z100 owner would be worth it for this module alone.

Data base management module

I have been using Condor 2 for several years. I once asked Zenith how much an update to Condor 3 would cost; I was told that Condor 3 was an entirely new product, and that they didn't plan to treat it as an update. Well, I no longer need to update to Condor 3. Enable's data base manager is a powerful modern DBMS.

The data base management system is menu driven, but I found I didn't mind the absence of a command line. The operation is fast and particularly easy to learn. The documentation is clear, but the prompts used in the menus are so obvious that the documentation is not really needed until the advanced features of the system are used.

Enable's DBMS allows in excess of 65,000 records in a file, and each record can have up to 255 user-defined fields. Each field may contain up to 255 characters, and each record may contain up to 64,517 characters. Clearly, your disk storage space will become limiting before these DBMS limitations are reached.

Both the range and the depth of the features available are more than I have seen in any other microcomputer DBMS. The data-entry forms and output report formats are entirely flexible. Some helpful sample forms are provided so that you can get started without having to learn about form design.

Records may be selected for review or editing based on a wide variety of field-comparison options, including a method known as a "query by example." Here, the user fills out a data-entry form with only the information that is being sought (for instance, a particular ZIP code, last name, etc.). Then, the DBMS finds all the records that match the supplied information.

Advanced features of this DBMS include: use of multiple data bases for report generation; use of data generated by the spreadsheet as input to records; an extensive language for designing reports; and updating of data base fields with results of computations of fields in the same or other data bases.

Some of the features support procedures that are used in very demanding environments. Some offices, for instance, input their data twice by different data-entry people in order to isolate errors. Enable provides for this input and re-keying verification.

Enable's DBMS is compatible with the data base format used by dBASE II, dBASE III, Condor 3, and PC File III. You can read and write the formats as if the data base files were in the native Enable format. This feature completely eliminates any retyping of data to port it to the new format. (Condor 2 files are not directly supported, but I was able to write out my Condor 2 data as an ASCII file and read that file back into the Enable data base.)

There were two items that concerned me about this DBMS. One was that dates are required to be input in the format YY/MM/DD. I just don't like having to use this format. I realize that it is easier for sorting, but the task of straightening out dates should fall on the programmer rather than on the user.

Second, Enable has a feature to back up files to floppy disks, but it did not seem to work on the Z100. Neither the manual nor the prompts were particularly clear on this command, and I couldn't make it back up my hard disk data to drive A:. This is a small matter because there is no problem copying data bases from one disk to another to create backup copies.

Telecommunications module

Finally, Enable includes a module for modem communications. This module can use autodial modems. Ordinary text transfer, Kermit file-transfer, and XMODEM error-checking protocols are available. An option exists to have a second number dialed if the initial autodial attempt fails.

Enable's menus are so convenient, the documentation is often not needed.

The XMODEM file-transfer option gave me trouble at first. It could not recognize the CompuServe system. I reported this to The Software Group, and they informed me that the program contains a bug in this module. Enable can use the XMODEM protocol only if the modem module is initialized to transfer eight-bit words with no parity. Once initialized in this fashion, file transfer worked without problems.

The module has commands for unattended file transfer, allowing remote system servicing.

All in all, I found that this section of the Enable package fell short of my needs. The ability to apply scripts for logging on and operation failed to measure up to my current modem program. These shortcomings could be overcome using macros defined at the system level, but I feel that the flexibility of the log-on facilities should be given another look by The Software Group.

All the other modules in the Enable package are at the top of their individual fields. While the telecommunications package does not meet this standard, it is still a fully-functional, acceptable package for the needs of the person doing quick and easy communications.

Overall

Enable is a superbly documented package. In most cases, though, the menus are so convenient that the documentation is not required. But once you go beyond ordinary tasks, you can spend weeks becoming an expert on all the diverse features available in Enable.

ShowOff

I continue to be intrigued by the interlace mode of the Z100. I'm convinced that this feature has not been used to its potential. The ability to produce a 480 x 640 pixel display places the Z100 in the same class as many professional graphics terminals.

Until recently, software that supported the interlace capability had been sparse. (One program that does is ED48, an editor from FriendliWare; I reviewed it in the "Z100 Notebook" in *Sextant* #27, March-April 1987.)

Now there is a screen-graphics editor that uses the Z100's interlace capability. It's called ShowOff, and it's from Hogware Company in St. Louis. I've obtained a copy of this program and truly enjoy using it.

This program marks a major milestone in the Locke household. I handed the manual to my oldest son (age ten), and told him to figure out how to use the program. He did! Now it's only a matter of time before he has the computer completely under control.

A choice of drawing methods

ShowOff is particularly easy to use. The manual gives an explanation of each graphics command, a two-page table summarizing all commands, and a nine-lesson tutorial.

The ShowOff distribution disk contains two versions of the program. One of these is designed for use with a mouse. The other allows use of the Z100's numeric keypad for screen drawing, with commands such as up, down, up and left, etc. A third version, designed for use with a digitizer pad, is available from Hogware for an additional $10.

I don't particularly like trying to draw with a mouse. Using the device reminds me of drawing in the sand with a rock. On the other hand, the keypad keys are too limiting for my tastes. I'm sure that the computer artists of the world have developed the perfect input device. I just don't know about it.

Hogware recommends the Logitech C7 Mouse, and sells it with ShowOff for an extra $90. Apparently, it is quite smooth for drawing. I used the Mouse Systems PC Mouse, and it worked. In any case, this program will demand at least 384 kilobytes of random-access memory (RAM), three banks of 64-kilobit video-RAM chips, and version 2 or higher of the Microsoft Disk Operating System (MS-DOS).

Using it

Without doubt, the most impressive feature of ShowOff is the high resolution you can obtain. The cost of this feature,

however, is that the screen tends to flicker with some color combinations. And bright electric lighting causes a sort of strobe effect that will make the flicker worse. (This problem stems from the interlace activity itself. The screen is first painted with the usual 225 horizontal scans; then scan lines are painted in between those of the first pass.)

The flicker can be reduced considerably with high-persistence monitors such as the Zenith ZVM-136 or ZVM-1360. These two models are no longer available from Zenith, but you may be able to find one of them through local Heath/Zenith computer dealers.

ShowOff lets you do freehand drawing with either the mouse or the cursor keys. It allows use of simulated "spray painting" using a random dot pattern. (It sprays from a square nozzle instead of a round one.) The user defines the size of the sprayed area.

You can automatically produce lines, boxes, circles, and ovals. ShowOff uses "rubber banding," so the line or figure grows as you move the cursor away from some starting point. This way, you get to play around with a figure prior to finalizing its position. The lines produced by the simulated drawing pen may be varied among ten patterns, including solid, dotted, dashed, and dot-dash.

Existing screen images may be moved, copied, rotated, and flipped. The rotation is rather time-consuming, and could probably stand some more tooling to speed it up.

An entire alternate picture may be held in the computer's memory, and images may be copied from one picture to the other.

The screen-fill routine may be used for painting an irregular area defined by a boundary line already on the screen, or a rectangular area defined by the user. The filling may be done with one of 92 colors. Or you can use one of 92 predefined patterns—little squares with circles in them, for instance, or a sort of picket-fence design. ShowOff comes with just about every kind of patterned "wallpaper" I can imagine. And if you want others, you can define new fill patterns.

ShowOff gives you 26 text fonts and allows your text to be placed on the screen in nine different sizes. You can specify the angle at which a line of text is placed on the screen.

Screen pictures created by ShowOff may be placed on disk or dumped to one of a large variety of printers. For compatibility, the program is able to read files created by Palette, a graphics editor from Software Wizardry.

I should note that it is possible to use the alternate picture as a scratchpad and copy previously prepared picture sections onto your current picture.

Problems

I did observe a couple of problems that need fixing in ShowOff. I noted that if a figure is allowed to intersect the top screen boundary and is subsequently filled, the filling color will leak around the top of the figure and flood the screen. You can fix the picture using the "Undo" command, but you have to wait until it has finished painting the whole screen, and that can take around a minute. The filling routine should observe the same boundaries as the drawing routines.

Also, if a figure does intersect the top of the screen, the part of the figure that would extend above the screen appears at the screen bottom, damaging that section of the picture.

One feature that I have enjoyed in other graphics programs, but miss in ShowOff, is the ability to play back the keystrokes that were used for picture creation. This provides a sort of live animation, and it would allow creating picture macros on a disk for later inclusion in a complicated picture. I suspect that in many cases the playback files would take up less disk space than the current saved files.

Support utilities

Several utilities are included with ShowOff. These include a memory-resident program that may be invoked from within either ShowOff or some other application. This utility allows you to grab a screen at any time and place it in a disk file. Two versions of this utility exist, allowing capture of either high- or low-resolution (interlaced or non-interlaced) screens.

Numerous screen-dump printer programs are included. I recommend that you check with Hogware to find out whether your printer is supported.

Finally, a "slide show" utility allows displaying a sequence of screen images, with a time delay specified by the user.

There is no doubt that ShowOff would be useful to any individual desiring to do screen art, either for professional purposes or for the fun of it. I strongly recommend this program.

Ordering Information

Enable, Z100 version, $195;
IBM-compatible version, $695.
The Software Group
Ballston Lake, NY 12019
800/634-3470; in New York,
800/551-1004

ShowOff, $79; including the Logitech mouse, $169; demonstration disk, $3.
Hogware Company
470 Belleview
St. Louis, MO 63119
314/962-7833

Palette, $89.95.
Software Wizardry, Inc.
1106 First Capitol Drive
St. Charles, MO 63301
314/724-1738 △

EXAM BUILDER

The Most Comprehensive Exam Storage and Generation System on the Market—In Use In Over 200 Major Universities

- Multiple User-Chosen Subjects
- Complete Question Entry/Edit Capability
- Random or teacher-selected items for finished exam
- Single or Multi-Subject Exams
- Printed copy is ready for reproduction
- Master list print capability
- Password protected answer keys
- Zenith, Apple, TRS-80, IBM

School Purchase Orders Accepted
No Time Limit Guarantee

$99.95

(316) 682-0156
A.U. SOFTWARE—DEPT. ST
P.O. Box 8369
Wichita, KS 67208

Circle #130 on Reader Service Card

HARDWARE HEATH/ZENITH

SURPLUS - SALVAGE - ETC.
Most Circuit Boards for the Heath/Zenith Line, Z-241 and Z-248 CPU/MEM and I/O Boards $75.00 Ea. Z-158 (NEW) Winchester Cont. Bb. $75.00 Ea. CPU/MEM and Floppy Disc Cont. $75.00 Ea. Z-151 CPU - Video - MEM $35.00 Ea. Floppy Disc $45.00 Ea. Z-100 8 MHz Mother Bd. $100.00 Ea. 5 MHz Mother Bd. $25.00 Ea. Video Bd.(NEW) $35.00 Ea. Z-171 Main Bd. $50.00 Ea. NEW Modem $100.00 Ea. Thousands of Cables and Miscellaneous Items for Z-171. Z-148 CPU $50.00 Ea. I/O Bd. $50.00 Ea. H-89 CPU $35.00 Ea. Terminal Logic $25.00. Call or Write for a Price List - Continually Getting More Stock Each Month - Shipped U.P.S. - C.O.D.

Self Addressed Stamped Envelope to:
Al Davis
4894 Lake Chapin Road
Berrien Springs, MI 49103
Phone: (616) 471-1792

SAVE THIS AD!

CHEAP PRICES!

Circle #122 on Reader Service Card

Circle #216 on Reader Service Card

Computer Self-Defense: Getting the Upper Hand

What are *those computer experts talking about?*

Doris Wagner and Al Heigl

Welcome back to our beginners' guide to using Heath/Zenith computers. In the May-June *Sextant*, we started this series by looking at some steps to take before you even begin to use your computer. We suggested such points as keeping accurate notes on all the details of your individual computer, providing the proper environment for your computer, and caring for floppy disks properly.

And now, since we've looked at some of the ABCs of using your computer, it might be a good time to suggest a few definitions.

Terminology

Even if you don't want to be a hobbyist, and even if you don't need to know the innards of your machine, it's good to be aware of what's going on inside (just as any driver should have at least a vague idea of the workings of a car). For example, you'll want to learn what a "monitor ROM" is, and what it does for you.

This is not the same as learning *how* it does what it does. In short, pick up a few details from time to time. You'll feel much more the master of your machine. (See below, by the way, for a discussion of the monitor ROM.)

Anyway, now that you're all ready to start using that computer, let's briefly cover a few handy definitions.

Hardware is the physical computer and its accessories, such as disk drives, printers, etc.

Software is programs—games, word processors, you name it. *Data* is in many ways similar to software. It can include text files (such as correspondence, articles, etc.) and numerical data (such as an accounting program would produce). Programs and data will usually be stored on disk.

Firmware is a hybrid—it's software stored in hardware: the program or data is encoded in an integrated-circuit (IC) chip. This chip will be some form of *read-only memory (ROM)*: a physical IC chip called a ROM.

ROM is not what people usually mean when they talk about "memory."

***Right now, perhaps all you want to know is what an operating system* is.**

That memory is *random-access memory (RAM)*.

Sometimes, you may hear RAM referred to as "read/write" memory. As you create a document with a word processing program, for instance, you are both reading RAM (to see what you've already typed) and writing to it (as you type in still more). RAM is the computer's internal memory area that holds your program while it's running, and your work while you're doing it.

RAM goes away when you lose power; if that letter wasn't saved to disk, it's lost. ROM, on the other hand, is part of the machine and is changed only by physical modifications. Most often, that means getting a new ROM chip.

There are, however, ways to *write* to "read-only" memory chips. That may sound like a contradiction in terms, but the possibility to electronically alter ("burn") a ROM chip has given rise to a number of different kinds of ROM chips: programmable ROM (PROM) and erasable programmable ROM (EPROM) are two. For normal operations, however, the chip is still a read-only device.

And in case "writing to a read-only device" seems to be an interesting idea, you may have wondered about that term "random-access." After all, the computer or your program can go to any particular location in memory it wants to; that seems rather deliberate, not random at all.

In fact, the term betrays something of computing's history. Originally, memory was "serial": to read something in the middle of memory, you had to pass through everything preceding it—much like finding something on cassette tape. The order in which you stepped through memory was fixed; now it's "random."

And some more terminology

Well, we've been talking about the computer enough—it might not be a bad idea to turn it on. But simply turning on the power may not produce anything interesting. *Booting up* is how you actually get a computer to start operating. (Inside most machines, there's a switch to enable the "autoboot" feature; turning on the power will then start the boot process. Otherwise, you may have to hit the "b" key or some other key.)

"Booting up" refers to computer software that "pulls itself up by its bootstraps." The monitor ROM is the only "program" running when you power up—it's there and running because its instruction codes are manufactured into the ROM chip.

When you boot, the monitor program goes to your operating-system disk and reads in a small piece of program code that's been previously written at the start of the disk's outermost storage track. That small program from the disk contains instructions to read the disk for a still larger component of the operating system. The larger program has been written to go back to the disk and get all of the rest of the programming needed to

Doris Wagner counts many Heath/Zenith machines as friends—the H89, the Z100, and the Z150 and its ubiquitous compatibles. Al Heigl has an H8, H89, H120, H160, and a very large electric bill.

Z-100 UPGRADE ACCESSORIES
(Military Users, Z-100 Products on GSA)

UCI EasyPC, IBM PC Emulator **$489**
UCI EasyI/O-2, IBM COM Port Board **$129**
UCI EasyWIN, Hard Disk Controller **$245**
40MB Kit **$925**
60MB Kit **$999**
UCI Memory Upgrades
New Motherboard Upgrade **$69**
EasyRAM Memory Card
OK to 2MB ..... **$325 - $599**
UCI Speed Upgrade Kits
Old Motherboard **$149**
New Motherboard **$155**
UCI Easy87, 8087 Co-processor Board **$79**
FBE ZMF100a Old Motherboard Memory Upgrade .. **$59**
FBE Smartwatch with Spacers **$44**

PRINTERS

Star NP-10, 100cps draft, 25cps NLQ **$199**
NEC P6 80 Col, 24 Pin Dot Matrix **$565**
P7 136 Col, 24 Pin Dot Matrix **$850**
9' Printer Cables **$19**
AB Switch Boxes **$33**

POWER & SURGE ACCESSORIES

Leadman 6 Plug Surge Protector **$19**
Datashield Power Backup Systems
300 Watt **$487** 500 Watt **$755** 800 Watt **$855**

PC SOFTWARE

Lotus 1-2-3	$395	PFS First Choice	$129
WordPerfect	$245	Wordstar 2000	$260
dBaseIII+	$478	Wordstar Professional	$299
Symphony	$558	Microsoft Word	$298
Paradox	$495	Multimate Advantage	$306
Multiplan	$155	Questions & Answers	$258
Sidekick	$63	Microsoft Windows	$80
Clipper	$495		

SEAGATE HARD DISK DRIVES

ST225 20MB w WD Controller **$395**
ST238 30MB w WD Controller **$424**
ST251 40MB, 40ms Access **$592**
ST4038 30MB Full Ht for AT **$595**
ST4051 40MB Full Ht for AT **$699**
External Hard Disk Chassis **$120**

FLOPPY DISK DRIVES

5 1/4 Fujitsu 360K **$98**
5 1/4 Fujitsu 1.2 MB **$145**
3 1/2 Toshiba 720K w/PC/XT Converter Kit **$165**

ADDONICS MEMORY UPGRADE BOARDS

XT Intel/Lotus Spec, OK, Expandable to 2MB ... **$210**
AT Intel/Lotus Spec, OK, Expandable to 1.5MB, 1 Ser, 1 Parallel, Clock **$279**

NETWORKS

ViaNet+KAL Adaptor Card PC/AT	$395
Z-100	$445
LANlink	$449
Multilink Advanced	$549

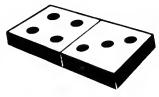
CHIPS

64K DRAM 150ns	$1.25 ea.
256K DRAMS 150ns	$2.95 ea.
256K DRAMS 120ns	$3.15 ea.
V20 8 MHz	$14.00 ea.
8087 5 MHz/8MHz	$125/$165

LIGHTEK

948 Cherry St., Kent, OH 44240
1-800-824-2667 (orders) • (216) 673-5358

Circle #177 on Reader Service Card



DOMINO COMPUTERS

Z89/90 SOFTWARE

ELECTRONIC TYPING	$ 79
CONDOR DBMS	671
CBASIC (CP/M)	111
PEARL III	359
MICROSTAT	199
MAGIC SPELL	283
DATASTAR	236
WORDSTAR	316
MAILMERGE	108
MICROSOFT BASIC	140
MICROSOFT COBOL	316
MICROSOFT FORTRAN	156
CP/M OS	140
MULTIPLAN	279
MAGIC WAND	236
PROPERTY MGMT	746
GENERAL LEDGER	316
INVENTORY CONTROL	396
SALES INVOICING	236
ACCTS RECEIVABLE	316
SUPERCALC	159

Z100 SOFTWARE

Z-CHART	$ 78
CONDOR DBMS	338
CONDOR FILE MGMT	155
LOTUS 1-2-3	350
SUPERSORT	103
WORDSTAR 3.3	325
MAILMERGE 3.3	200
SPELLSTAR 3.3	100
MBASIC (CPM-85)	125
MULTIPLAN	125
CP/M-85 OS	125
PEACHTREE GL	295
PEACHTREE INVENTORY	295
PEACHTREE INVOICING	195
PEACHTEXT 5000	250
MICROSTAT FOR Z-DOS	200

CALL FOR SPECIAL HUG DISCOUNTS ON NEW PRODUCTS.

WE STOCK MOST ZENITH PRODUCTS

WE RENT COMPUTERS, TOO!

GET YOUR ZENITH CHARGE CARD THROUGH DOMINO COMPUTERS

Zenith data systems
AUTHORIZED DEALER

108 N. Hickory Avenue, Arlington Hts., IL 60004
312/870-8707

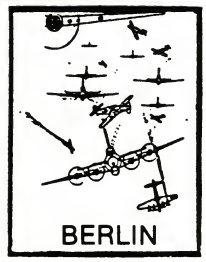
Circle #232 on Reader Service Card

SIRIUS SOFTWARE INC.

★ NOW AN AUTHORIZED ZENITH DEALER ★

We have all types of high quality Zenith computers.
Z-158's Z-200's Z-148's Z-181's
Please call for pricing in the configuation you need.

OUR OWN QUALITY SIRIUS SOFTWARE



SUPER TREK
A space war game in full color graphics. Do battle with dreaded Kligites. Avoid worm holes. experience black holes.
$29.95

KONGO
Avoid the obstacles and traps as you search for treasure in a variety of increasingly difficult mazes. Full color animated graphics.
$29.95

BERLIN
Control over 100 planes at once while you take command of the air war over Europe during WW11. Play the American side or the German side against the computer. Berlin is for the Z-100 only. (one or more players)
$39.95

VISA
Orders Only Please PHONE 1-800-423-7801
Florida Residents Inquiries 1-305-971-8068

SIRIUS SOFTWARE, INC., 1524 N.W. 65th Ave., Margate, FL 33063

Circle #212 on Reader Service Card

run the full operating system—which is what you'll need to run your own programs. (More on the operating system, below.)

A *reset* or *hard reset* sets the hardware and firmware to a fixed starting point. Turning the computer off and then back on is a hard reset. Also, on the '8, '89, and '100, there are two-key combinations (CTRL-RESET on the '100) that are actually wired up to do the same sort of reset that a power-up will do.

On the '150/200-series machines, you can use the three-key combination "Alt-Ctrl-Del" to reset the computer. However, this is *not* a hard reset. These keys are not wired into a reset circuit; rather, they work because the computer's firmware detects that these three keys are being pressed simultaneously. This means that the firmware must be functioning at the time. If a programming problem has disabled this, you can hard-reset the computer only by turning it off and then back on.

Al: I have installed a separate hard-reset switch on my '160. There are kits and simple plug-in modifications available, and articles on how to do this. Using a separate reset switch has essentially the same effect as the power-off/power-on sequence, but is far kinder to the machine than an abrupt off, then on again.

A *cold boot* is one where the machine is hard-reset and the boot-up sequence is begun from square one.

A *warm boot* does not re-install the operating system from scratch. At least some part of the operating system in memory remains intact. It may reload some parts of itself, though.

You do not want to do a hard reset, cold boot, or warm boot if you are in the middle of running a program. Any of these actions will stop the program, and in general, you will not be able to restart it from where it left off. Whatever you were working on will be lost unless it had been stored to disk.

Get to know your operating system(s)

In the old days, beginning with the H8 and '89, we had to start by figuring out what the heck an operating system was and what it did. That wasn't very long ago, and we haven't really progressed all that far. Casual users can get into lots of trouble by ignoring what's going on at that level. Without some understanding of how to use your operating system, you can't follow all the good advice in this spiffy series.

For now, though, perhaps all you want to know is what an operating system *is*.

Put as simply as possible, there is a particular type of software that acts as a bridge between the hardware/firmware and the program you're running. This is called a *disk-operating system* or DOS. It acts as a "resource manager" for your computer's hardware, and generally relieves individual programs of the need to know exactly how your machine is set up. (Since the ZP-150 laptop has no disk, its "DOS" is just an "OS.")

Many people use the term "DOS" to refer to disk-operating systems in a generic sense. Unfortunately, others use it to refer to a specific operating system, usually the Microsoft Disk Operating System (MS-DOS). In general, we'll try to avoid this confusion by referring specifically to "MS-DOS" or to just "the operating system."

More than one level

There is a hierarchy involved in running a program.

Suppose that you are using an accounting program. This is your *application*, and it is doing calculations based on the figures—data—you have input to it.

At some point, the program's task is to display a total on your terminal screen. In a typical system, the program passes the total to the operating system. The operating system then passes it to the monitor-ROM firmware. The firmware then passes each character to the hardware, and the hardware's circuitry displays it on the screen. (See Figure 1 for a depiction of this relationship.)

The operating system, then, is a program that lets you, your computer, and whatever application program you're running all talk to one another.

After you've booted your computer, you can type in the command to ask for a directory of all the files on a disk (CAT, DIR, or IND in HDOS, DIR in almost everything else). Here, it's the operating system that will give you the disk information. When your accounting program or word processor stores your work on disk, it actually does so by telling the operating system to do it.

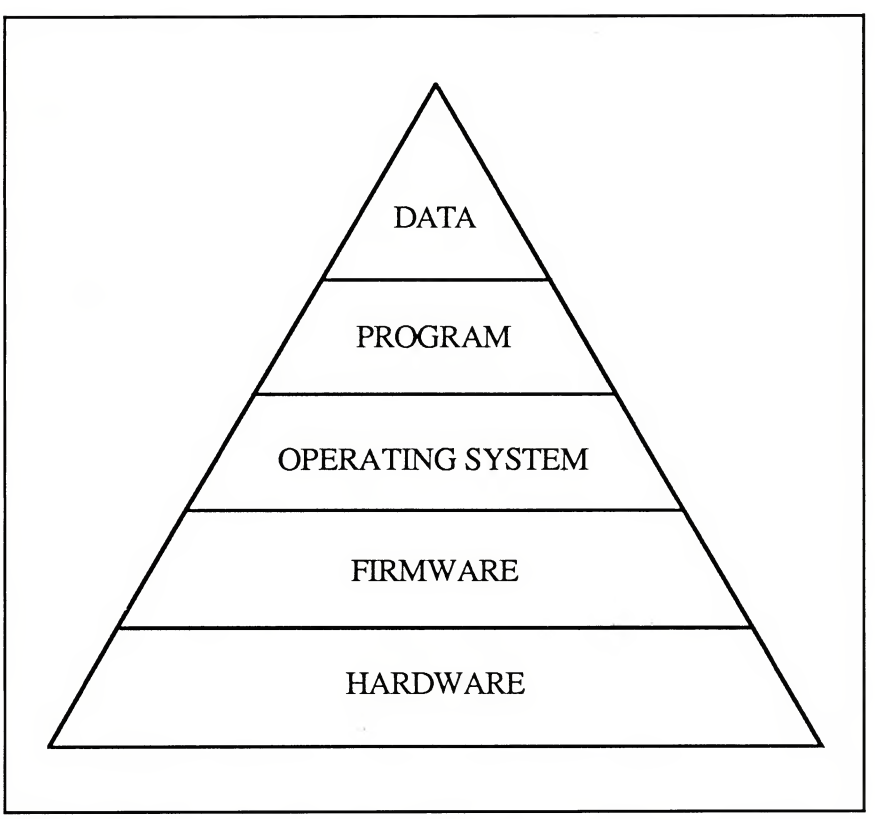


Figure 1. The relationship of a program to the computer on which it runs is hierarchical. For instance, to communicate with the hardware, a program usually goes through the operating system. The operating system, in turn, usually talks to the hardware through the services of firmware, i.e., programs permanently stored in read-only memory.

More than one operating system

A number of operating systems run on various Heath/Zenith computers. Most models can run at least two, and the Z100 can run at least four. So, it's easy to get snowed under by all the names and versions. Table 1 attempts to sort them out.

When you go out to buy commercial software, you've got to keep track of what you have available on your machine. This is why our first installment of this series urged that early note-taking. The same program may be sold in a dozen flavors, and Product X sold for the '150 may not work on the '100.

Those of you with IBM compatibles have a relatively easy time of it. If the program is intended to run on the IBM Personal Computer, it should run on the Z150 series, the Z200s, etc. Nonetheless, when you purchase software, you are responsible for knowing exactly which hardware and operating system(s) you

have. The program packaging (or the dealer) should then tell you whether a particular program will work properly in that environment.

As an example, consider those software "charts" currently being used in the Heathkit catalogues. See those bottom lists of "Minimum Computer Hardware and Software Requirements"? That's the kind of information that you are responsible for knowing.

Stick with one operating system in the beginning—if you can.

It's easier to learn operating systems one at a time. There are similarities and subtle differences. The choice is yours, and will probably depend on what software is available and what it runs under. Keep the operating-system manual close at hand.

Let's do *something already*

OK, you're all set up, and you want to personally compute. Where do you start?

Well, if you purchased your computer to help you do a particular task (whatever it may be), and you need to get started doing it, you should probably go right ahead and begin. Study the documentation, learn to run the program, and have at it. Work slowly and deliberately, and keep notes. (Then come back to this article in your spare time—if you have any.)

If you have no screaming need for immediate results, you have the luxury of being able to explore your computer and build up a pleasant familiarity with it.

The first familiarity of great importance is being able to type properly. The hunt-and-peck method has obvious limitations.

If you don't know how to touch-type, this is a good time to learn. And if you are a good typist, but your spouse and/or kids aren't, you have a family project with a very good objective.

Al: I have always been grateful that my dad "forced" me to learn touch-typing back when I was in junior high school. It eventually became somewhat helpful in high school, very useful in college, and then I got a computer. . . .

There are "typing tutor" programs for all H/Z machines, and they are very good. They are also relatively inexpensive, and represent an excellent value.

Al: When I worked at the Heathkit store, I saw many a practiced computerist come in for help with a long program—hundreds of lines—that were obviously painfully keyed in with a couple of fingers. When I sold a computer system, I asked whether everybody who would be using it could touch-type. If not, I'd do my best to add a typing program to the invoice.

Before you begin

Once you are in "touch-typing mode," you can think about which program you want to try. Before you start to run a program the first time, there are three basics that you should be aware of, and that the program's manual should tell you. These are:

- The proper command(s) to start the program.
- The way in which you can cleanly exit the program without losing any data you have created.
- The recommended way(s) in which you can cancel or recover from giving that program an unintended or "wrong" command.

Being sure of these three points can leave you feeling a bit more relaxed about using a program. To be even more relaxed, though, how about starting with a game program?

Fun and games

Games can be an excellent introduction to the keyboard layout and a transition into the world of computers.

An "Adventure" game will help you learn the keyboard. (Doris likes "A Remarkable Experience," from Hoyle & Hoyle Software. It's available for most Heath/Zenith computers and operating systems.)

The Adventure games go back to the dawn of computing, which is why your wandering through caverns must all be described in the form of messages and responses between you and the computer. When the first Adventure game was created, screen display graphics were just a dream.

This can be a big advantage, though. After all, you may *want* to practice your typing; a graphic-type game where you just move around on the screen and push the space bar to kill an "invader" may be fun, but not too helpful in this area.

Doris: I admit to "wasting" many early hours playing games. I had fun, and I reckon I learned some things. In my efforts to beat the program, I was learning how to use the machine, the operating system, and the program itself. I was "gaming" on a higher level. Computerphobias were gone soon enough, and I could venture into new areas with an adventuresome spirit that has usually been useful.

Generally, these games will let you "save" the playing conditions when you want to. So you will also get some experience with using your disk drive(s) for data storage and retrieval.

We don't want to dismiss those arcade-type games, either. They keep your reflexes sharp and also can give you an idea of your machine's computing power.

Perhaps the only danger of games is excitement: kids aren't the only ones who'll be tempted to start beating on the keyboard. It's a good idea to establish rules for computer care and etiquette, for all family members—including yourself—right from the beginning.

Next time. . .

Family etiquette, though, is a reasonably personal subject, and a good place to end this installment. We've just barely begun to look at actually using your computer. Next time, we'll take a look at a few good habits to acquire—and some pitfalls they'll help you avoid.

Ordering Information

A Remarkable Experience, $29.95.
Hoyle & Hoyle Software, Inc.
111 Sparrow Drive
Isle of Palms, SC 29451
803/886-5802 △

IBM compatibles	Microsoft Disk Operating System (MS-DOS) PC-DOS (IBM's version of MS-DOS) CP/M-86 Xenix Concurrent PC-DOS
H/Z100	MS-DOS Z-DOS (Zenith's implementation of MS-DOS version 1) CP/M-86 MP/M-86 CP/M-85 (Runs ordinary CP/M-80 software) Concurrent CP/M
H/Z89	CP/M-80 Heath Disk Operating System (HDOS) UCSD p-System
H8	CP/M-80 HDOS UCSD p-System

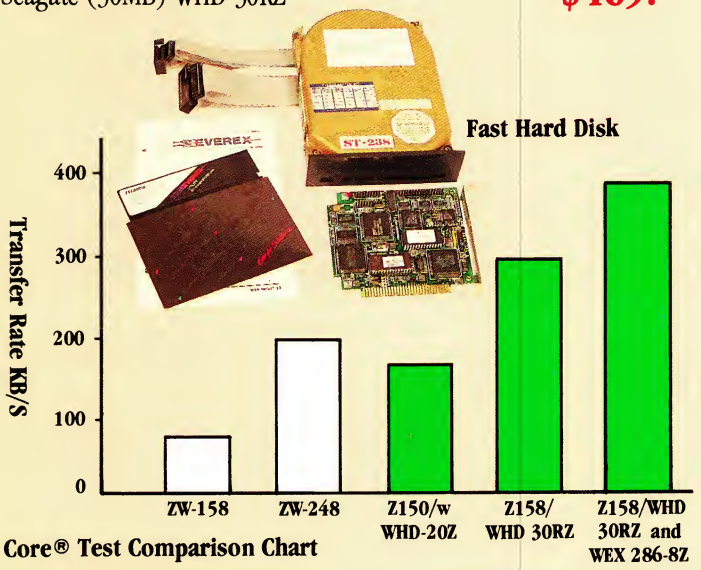
Table 1. The various operating systems that run on Heath/Zenith computers and the particular models on which they run. (Not all of these operating systems are currently available.) Here, "IBM compatibles" refers to the H/Z138-148-150-160 series, the Z171, Z181, and Z183, the eaZy pc, and the H/Z200 series.

WELCOME TO THE EVEREX WORLD OF H/Z HIGH QUALITY UPGRADE

FOR H/Z-138, 148, 150, 158, and 160

Fully compatible with HS-317, supports all boot commands, boot directly from Hard Disk without seeking drive A. Extremely fast transfer! Up to 100% faster than ZW-248 and 500% faster than ZW-158.

Seagate (20MB) WHD 20Z **$399.50**
Seagate (30MB) WHD 30RZ **$469.50**

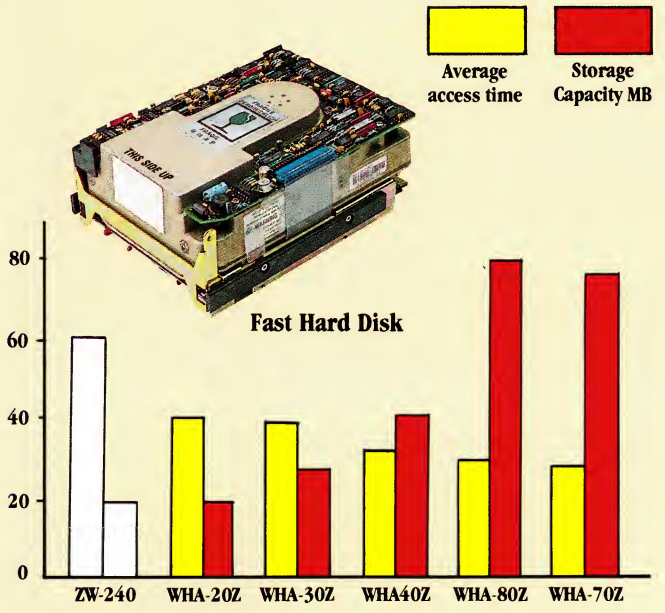


Core® Test Comparison Chart

FOR H/Z-200, 248, and 300s

Up to 160% faster than ZW-240 in average access time. Up to 400% more storage (80MB). Runs MS-DOS, Xenix, Novell, and 3Com.

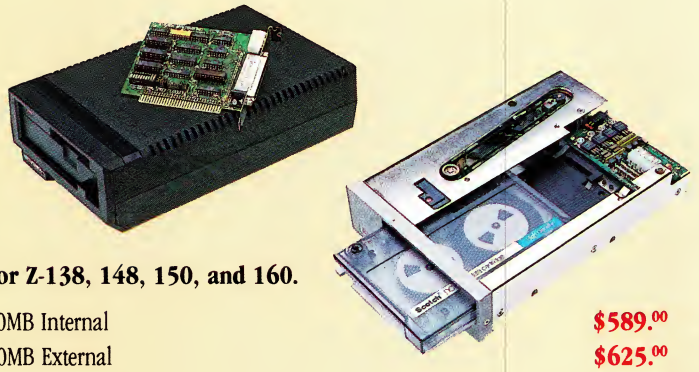
WHA-20Z	$499.00
WHA-30Z	$589.00
WHA-40Z	$699.00
WHA-80Z	$1059.00
WHA-70Z	$1159.00



Storage capacity and access time comparison chart

TAPE DRIVE FOR H/Z 140, 150, and 160

Backup 20MB in 4 minutes, extremely reliable backup operation. Internal or External Drives, user friendly software, Image/file-by-file. Works with Novell and Xenix.



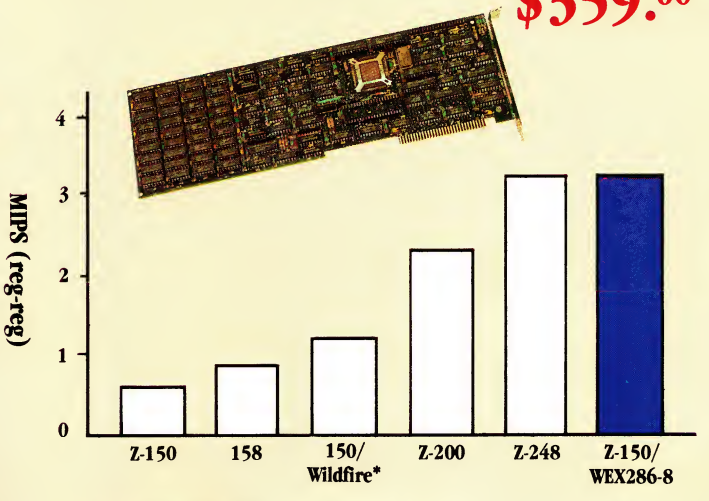
For Z-138, 148, 150, and 160.

20MB Internal	$589.00
20MB External	$625.00
60MB Internal	$729.00
60MB External	$659.00
120MB Internal	$1199.00
120MB External	$1395.06
Additional controller card for 20MB External unit	$99.00
Xenix driver	$99.00

EXCELERATOR (WEX 286-8)

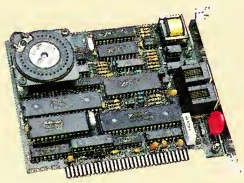
80286 at 8 MHz, faster than Z-200. On board 16 bit wide, 0 wait state RAM. 4-5 times faster than Z-150. Optional 5/8 MHz 80287 Math Co-processor. Perfect companion for WHD30RZ Hard Disk.

Starting at
$359.00



CPU Performance Comparison Chart ★ Software Wizardry

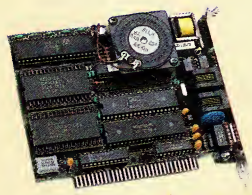
TOTAL HEATH/ZENITH COMPATIBILITY AND RELIABILITY BY WONG'S ADVANCED TECHNOLOGIES, INC.



EVERCOM 300/1200

- ★ Half size
- ★ Configurable to COM 1 to COM 4
- ★ Fully Hayes compatible
- ★ BitCom communication software
- ★ Emulates VT-100, IBM 3101, VT-52
- ★ User definable
- ★ Powerful script commands
- ★ Stores up to 32K numbers with different communication parameters
- ★ Reliable even on noisy lines.

$119

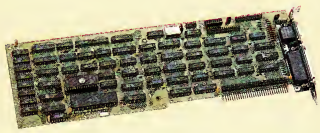


EVERCOM 1200/2400

- ★ Half size,
- ★ Configurable to COM 1 to COM 4
- ★ Fully Hayes compatible
- ★ BitCom communication software
- ★ Emulates VT-100, IBM 3101, VT-52
- ★ User definable
- ★ Powerful script commands
- ★ Stores up to 32K numbers with different communication parameters
- ★ Reliable even on noisy lines.

$229

Excellent for long distance call
FCC class 'B' approved

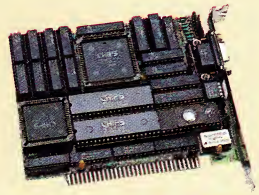


EVERGRAPHICS

- ★ Hercules 720 x 348 Monochrome graphics/64K
- ★ High Resolution text for W.P./Text editing
- ★ Spread sheet
- ★ High Resolution graphics for Acad, Lotus 1-2-3, and D.P.
- ★ Expandable to EGA

(TTL Monochrome monitor required)

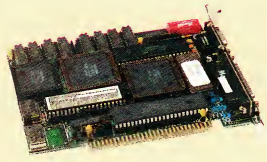
$99



MICRO ENHANCER

- ★ 640 x 350/16 colors from a pallette of 64
- ★ 256K RAM
- ★ Short card—5" long
- ★ W.P./color
- ★ Lotus 1-2-3, Acad, and M.S. window
- ★ Works with all 3 different monitors (EGA monitor is required to take full advantage of the EGA Mode.)

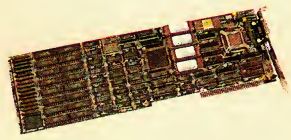
$189



MICRO ENHANCER DELUXE

- ★ 640 x 350/16 colors from a pallette of 64, EGA mode. CGE and HGA Autoswitch
- ★ Enhanced 640 x 480 and 752 x 410, 16 colors
- ★ 256K RAM
- ★ 132 columns x 60 line of text
- ★ Lotus 1-2-3, Acad, and Windows
- ★ Works with all 3 different monitors (Multisync type is required to take full advantage of the Multisync mode.)
- ★ 1/2 short card

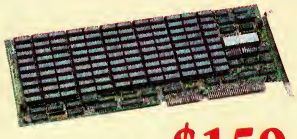
$209



EPGA

- ★ Fully PGA compatible
- ★ 640 x 480/256 colors out of pallette of 4096
- ★ Emulates, HGA & CGA concurrently operating on one monitor
- ★ 8 MHz 80286/512K RAM/TI Graphics controller to perform 2D and 3D graphics commands. For example: lines, viewing transformations, and more at a very high speed.
- ★ For CAD engineering, Scientific and Educational (PGA monitor required)

$850

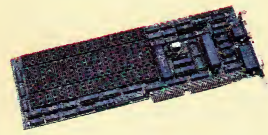


RAM Board, ϕK $159

RAM 3000

- ★ Add up to 3MB of extended memory on 1 board, 5MB with piggy back RAM for Z-200/248
- ★ High speed, up to 12 MHz operation
- ★ Compatible with Novell, MS DOS 5.0, Xenix, and RAM disk for MS DOS 3.1
- ★ Free software

RAM Chips (installed) 1/2MB 150ns **$56.50**
RAM Chips (installed) 1/2MB 120ns **$62.50**
RAM Chips (installed) 1/2MB 100ns **CALL**

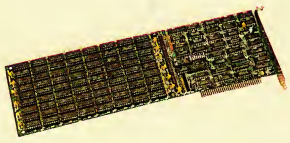


With ϕK $179

MAGIC 16

(Multifunction Card for Z-200)

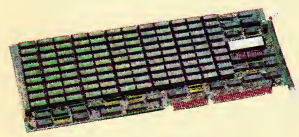
- ★ Add up to 2MB extended memory
- ★ 1 parallel, 1 serial port, optional 2nd serial
- ★ Free software



$119

MAXI MAGIC

- ★ Up to 2MB of expanded memory
- ★ For RAM disk
- ★ Print spooling
- ★ Run Lotus 1-2-3, MS Window and more
- ★ Up to 4MB with piggy-back board



CALL

EMS MULTIFUNCTION

- ★ 16-bit of Z-200 and 8-bit for Z-130, '140, '150 & '160

ORDER TOLL FREE
(800) 626-1030

3201 Loyola Drive
Kenner, Louisiana 70065

INSIDE LOUISIANA
(504) 464-7379

Circle #227 on Reader Service Card

WONG'S ADVANCED TECHNOLOGIES, INC.

ORDER TOLL FREE
(800) 626-1030

3201 Loyola Drive
Kenner, Louisiana 70065

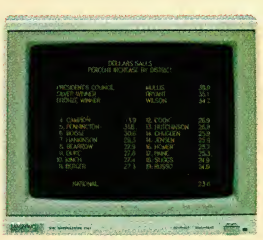
INSIDE LOUISIANA
(504) 464-7379

star micronics

- ★ Outstanding print quality and performance
- ★ High-speed draft and fine near-letter-quality printing
- ★ Front Control Panel for easy operation
- ★ Tractor and Friction feeds
- ★ IBM™ and Epson™compatible
- ★ Full one-year Warranty

NB-15

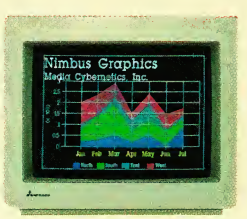
100 cps NP-10	**$169**
120 cps NX-10	**$229**
120 cps NX-15	**$369**
180 cps ND-10	**$359**
180 cps ND-15	**$479**
216 cps NB-2415 (24 pin)	**$729**
200 NB-15 (24 pin)	**$999**



MAGNAVOX TTL-MONOCHROME

- ★ Nonglare Amber or Green
- ★ 12" screen
- ★ 1000 lines of resolution
- ★ FCC class 'B' approved

$109
Amber or Green



MITSHIBISHI 1410 14" EGA MONITOR

- ★ 640 x 350 EGA
- ★ 640 x 200 CGA
- ★ FCC class 'B' approved
- ★ Auto contrast

$469

We also carry a full-line of Mitsubishi and Sony monitors. Please call for more information.

TEKNIKA M3-503 13" MULTI-STANDARD MONITOR

- ★ 926 x 580 Super High Res.
- ★ CGA/EGA/PGA/ANALOG
- ★ 16/64/4096 colors
- ★ Works with Z-100, Z-100 PCs, Z-200, and Z-386
- ★ Perfect match for EPGA and Micro Enhancer Deluxe

$499

M2 MOUSE

- ★ No slot needed, work through SIO
- ★ Removable Nylon Ball gives positive response
- ★ Works with all major software supporting a mouse
- ★ A must for Lotus, MS window and Acad

$74.95
* ADD $15 for DR. HALO

We accept pre-paid, COD orders. Credit card purchases please call. Shipping charges minimum: $3.00 for the first 3 lbs. via UPS ground. Louisiana residents add 8% sales tax. No return merchandise will be accepted without an RMA number. Return merchandise are subject to a 15% restocking fee. Prices are subject to change without notice.

Circle #227 on Reader Service Card

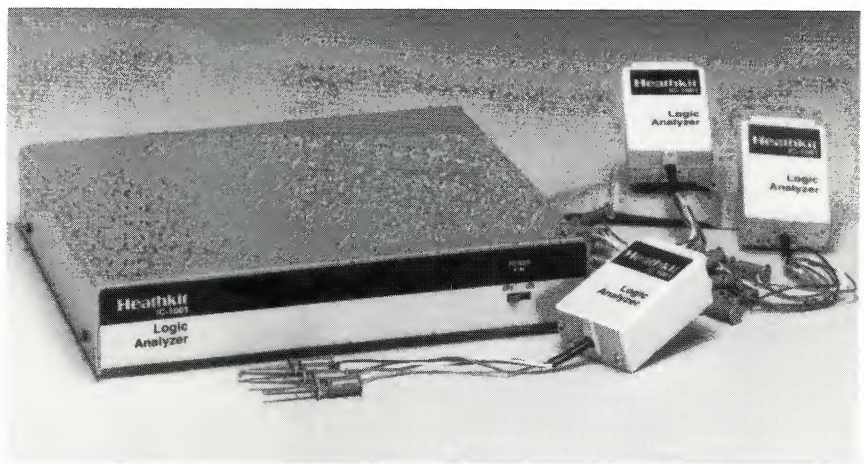
Supplier Notes

Getting Logical

Heathkit's IC-1001 Logic Analyzer is a diagnostic tool for digital circuits. It can be configured to capture a specific sequence of pulses, unlike an oscilloscope or logic probe.

With accompanying software, the Logic Analyzer allows a computer to show state and timing displays, including hex/octal and ASCII equivalents. This data can then be saved on disk for later examination or comparison. Further operations include a checksum capability with bit selection, for easy comparison of acquired data and the ability to search this data for a specific bit pattern.

The Logic Analyzer has 16 data lines, for checking a 16-bit wide data bus or 16 separate logic test points. There are also two clock qualifier inputs and a clock input. The Analyzer is compatible with TTL and 5-volt CMOS logic for use with a wide range of digital circuitry. It can be used with circuits containing sequential and/or combinational logic and having clock speeds of up to 10 MHz. The Logic Analyzer has a standard RS-232 serial connector for linking up to a computer or terminal, and features automatic speed selection between 300 baud and 19.2 Kbaud. There are also oscilloscope trigger outputs for use with an externally connected scope, and high-impedance inputs for minimum circuit loading. Inputs attach to circuits by convenient spring-loaded clips.



The Heathkit IC-1001 turns any IBM-compatible computer into a logic analyzer.

On-screen help, prompts, and status and error reporting are available. The IC-1001 has a 2K x 16-bit acquisition memory, and several versatile positioning commands determine how captured data is displayed.

The Logic Analyzer costs $269. Further information is available in the Heath Company's free catalogue. Write to Heath Company, Dept. 150-935, Benton Harbor, MI 49022 (in Canada, 1020 Islington Avenue, Dept. 3100, Toronto, Ontario M8Z 5Z3), or pick up a catalogue at one of the 65 Heath/Zenith Computers & Electronics centers in the U.S. and Canada.

An Industrial-Strength Computer System

Two new releases from the Heath/Zenith Computer-Based Instruments Group are built with industrial strength—for good reason, because both the SW-3000 Computer and the SW-3010 Industrial Monitor are designed for use under harsh workplace conditions.

The SW-3000 Computer is a fast IBM-PC-AT compatible that uses the 80286 microprocessor and operates at 8 MHz with zero wait states. An 80287 numeric co-processor is optional for even faster operation. The SW-3000 is equipped with 512K of RAM, a 1.2-MB floppy-disk drive, and a 20-MB hard-disk drive. Other standard features include serial and parallel I/O ports, six open slots for expansion, and an advanced video graphics card to drive MDA, CGA, EGA, VGA, and Hercules-compatible displays.

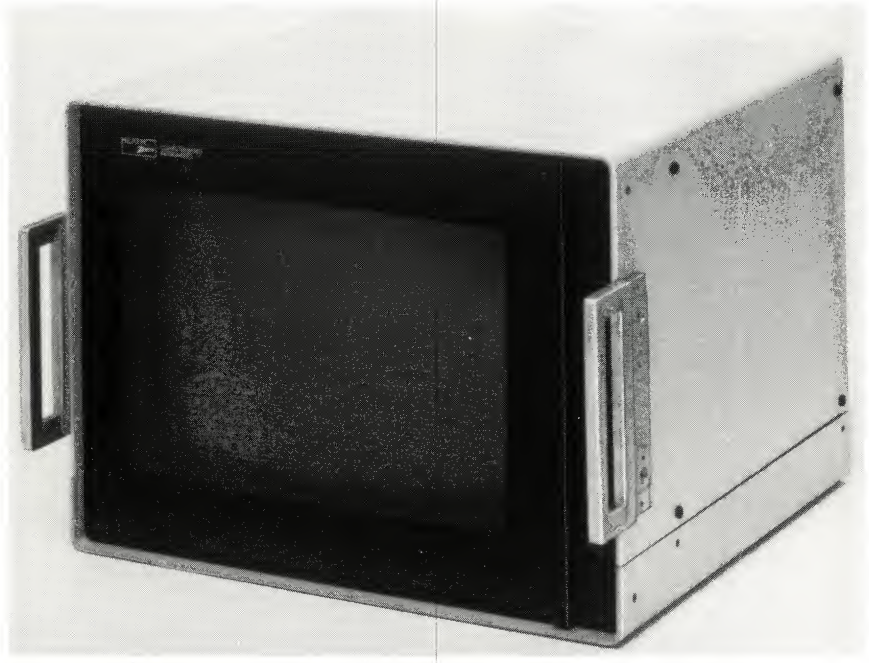
The SW-3000 is an MS-DOS computer designed for use under harsh conditions.

The SW-3000 runs MS-DOS to allow access to all software programs commonly used in business and industry. The computer can be rack mounted for lab or production-area use, and comes with a filtered fan that maintains a positive air flow through the computer to keep dust and dirt away. The keyboard of the SW-3000 is impervious to dust, dirt, and liquids.

The SW-3010 Industrial Monitor is a high-resolution 13-inch EGA video monitor housed in a rack-mountable metal

cabinet. It displays up to 64 colors from computers using RGB, RGBI, and RGBrgb outputs. The SW-3010 supports dual scan-frequency outputs of 15.75 kHz and 21.8 kHz for graphics resolution of up to 640 x 350 pixels. Other key features include a non-glare CRT, automatic switching between CGA and EGA modes, and a front-mounted green/amber text switch.

Other front-mounted operator controls include power on/off, brightness, contrast, vertical size and horizontal position. The monitor has an attached 40-inch video cable with a nine-pin D-type end connector for ready connection to EGA cards. A switch offers 120 VAC or 240 VAC operation. The SW-3010 is spill-proof, and, like the SW-3000, repels dirt, dust and other impurities by positive internal air pressure provided by a filter-equipped fan.



No, it's not a microwave—it's the Heath/Zenith Industrial EGA Monitor.

The SW-3000 computer and the SW-3010 monitor can be used together as a stand-alone computer system, integrated into a data acquisition and control subsystem, or used in conjunction with the SW-3020 Computer-Based Instrument System. The SW-3020 is a fully integrated testing and data acquisition system that is controlled by the SW-3000. With its array of optional test instruments, the SW-3020 can be rack mounted or placed on an engineer's workbench.

The entire system operates under the umbrella of the Heath/Zenith Versatile Instrument Operating Software (VIOS). This menu-driven operating environment controls all instruments with simple, single keystrokes, and all prompts and messages are in plain English. In addition, each major function includes a Help selection which allows immediate system access.

For further information about these products, write Heath/Zenith Computer-Based Instruments Group, Hilltop Road, St. Joseph, MI 49085.

EVERYTHING YOU NEED . . . $279.00

Now it's easy to program the Heath-Zenith HERO-1* Robot with an Apple* II. HERO* Macros for the S-C Software 6800 Cross Assembler program in Heath's Robot Interpreter Language with easily remembered mnemonics.

For example, the line: 1130 > MVWRIM GRIP, OPEN, 60, FAST instructs the HERO* to open his gripper 60 units at fast speed. Motor position is expressed in base-10.

The HERO* Macros come with 30 pages of documentation.

Transfer to HERO* with ROBI . . . an affordable interface for the robotics experimenter . . . is simple.

- ROBI is a complete package. No additional hardware required for Apple* or HERO*.
- ROBI installs quickly in an Apple* II, II+, or IIe. Once installed, no hardware changes are needed. Within minutes, you will be programming HERO*.
- With ROBI and the Cross Assembler, the programmer uses Apple*'s memory to write the program, and HERO*'s memory to run the program.
- Not "copy protected," archival copies may be made as needed.
- ROBI offers expansion potential.

VISA and MasterCard accepted

BERSEARCH Information Services
26160 Edelweiss Circle
Evergreen, Colorado 80439

The Cross Assembler with HERO* Macros sells for $100.00; the ROBI Interface sells for $199.00. Both as a package—$279.00.

To order, or for more information, call (303) 670-6137.

APPLE* is a trademark of Apple Computer HERO* is a trademark of Heath Electronics

Circle #223 on Reader Service Card

H/Z89-90 PRODUCTS

Replacement Back Panel
Replaces the existing metal back panel. Adds cut-outs for two 5¼" drives, 8" floppies, Winchesters, joy sticks, extra printers, modems, audio output, instrumentation and many, many more.
RBP-200 ..... $35.00

I/O Board Expansion
Adds four additional I/O board slots inside the computer case. Now have seven right-hand and four left side slots. Easy DIP switch port selection. Now run up to four disk controllers or multiple printer boards or ????
EXP-700 ..... $395.00

Transportable Conversion
Kit contains everything to convert an '89-90 into a 32-pound transportable computer. Nine inch amber CRT. Detachable keyboard. Conversion requires only a screwdriver and nutdriver.
TRA-890 ..... $950.00

4MHz Speed Up
Plug-in unit doubles the computer's speed. Eliminates long waits for program execution. Fully supports Heath, C.D.R., and Magnolia. No trace cutting.
DSM-240 ..... $99.97

Upgrade Monitor ROM
Replaces existing monitor. Supports 4 MHz operation. Boots eleven different devices. Expanded commands.
KMR-100 ..... $59.95

Extra Cooling
Extremely quiet 2½" fan provides required extra cooling for hot machines. Easily mounts between the two card cages. Plugs inside with the existing fan connector.
SCF-200 ..... $59.95

DSM-240, KMR-100, RBP-200, SCF-200 include $3.50 S&H/unit.
EXP-700 include $6.00 S&H/unit.
CA residents add 6½% sales tax.
All prices subject to change without notice.

KRES ENGINEERING
P.O. Box 1268
La Cañada, CA 91011
(818) 957-6322

Circle #194 on Reader Service Card

Classified Ads

Hardware

For Sale: 64K HDOS H89, H25 printer, software, diskettes. All for $650 or best offer. 509/522-0684.

Heath H89 with Magnolia 5″/8″ controller and 128K memory expansion. Includes software, two 5¼″ SS/DD drives, Epson MX-80FT printer, and Anchor 1200-baud modem, BIOS source, schematics, one foot of software documents, Heath BASIC and 8080 Assembler courses. $800 or best offer, you pay freight collect. The Mixingboard, Inc., Box 1488, Burlington, VT 05402. 802/658-4793.

H/Z100 low-profile, 768K, RGB memory, dual 5¼″ drives, Gemini board, monochrome monitor, technical manuals, extra used motherboard, software with manuals, 3 years *Sextant/REMark* magazines, more. $1,100. 404/565-5350, after 6:30 weekdays.

H/Z100 low-profile, 768K memory, full-color, 8 MHz, Zenith Color Monitor, dual 5¼″ drives, technical manuals, and much software. $1,700 or best offer. 203/576-6545; ask for Bob Havanec or leave phone number.

Information

PERSONAL COMPUTER OWNERS can earn $1,000 to $5,000 monthly selling simple services performed by their computer. Work at home—in spare time. Get free list of 100 best services to offer. Write: A.I.M.F.V., P.O. Box 60369, San Diego, CA 92106-8369.

How to Order a Classified Ad

To get in touch with your fellow Heath/Zenith users, place your short notice in *Sextant*'s classified section. The rate is only 75¢ per word, with a minimum of 15 words.

Please omit all *specific* references to software, unless the package is unopened. If unopened, please specify.

Send your typewritten ad and payment to: Sextant, Classified Ad Department, 716 E Street S.E., Washington, DC 20003. Please include your name and phone number for our records.

Deadline is September 24 for the November-December issue, and November 19 for the January-February issue.

Coming Up in Sextant

- *The Z241 sails around the world*
- *Speeding up the H8*
- *Editing with EDLIN*
- *A look at the C/NIX operating system for the '89*

LINDLEY SYSTEMS SUPPLIES

Diskettes

(All Diskettes are Double Sided)

Soft: (DSDD) White box	$7.00
Soft: (DSDD) 3M Highland	$8.00
Soft: (DSHD) (1.2 Meg) 3M	$25.00
Hard: (DSDD) Wabash	$8.00

Ribbons

Ribbon Refills w/Gloves	
#7201 Epson MX/FX/RX-80, MPI, Star (except Gemini)	$ 3.00
#72011 As above, RED	$ 3.50
#72012 As above, GREEN	$ 3.50
#72013 As above, BLUE	$ 3.50
#7210 Epson MX/FX/RX-100, MPI (wide carriage)	$ 3.75
#7202 NEC-8023, C.Itoh 8510	$ 2.50
Cartridges	
#7203 Epson MX/FX/RX-80	$ 4.75
#7206 Epson MX/FX/RX-100	$ 6.00
#7204 NEC-8023, C.Itoh 8510	$ 5.00
#7207 Diablo Multistrike	$ 3.75
Ribbon Spools	
#7205 Star SG/Gemini,Okidata	$ 2.50

Please add $2.00 to your ribbon or disk order for shipping & handling.

FILL IN FORMS QUICKLY

FormFiller lets you fill in forms quickly and easily. You get a professional printout every time. Eliminates positioning errors common with typewriter entry. Printer output may redirected to a disk file.

FormFiller can be used with any form whose rows and columns match those of your printer. Use a text editor to create a file which defines the fields of the form and positions on the form. This file will also contain the layout of the screen FormFiller uses when you fill out a form.

Requires MS-DOS version 2 or 3, IBM-PC compatible or Z-100. Order # 260, **$39.95** postpaid.

QDC

The Quick Disk Copy program for your PC. Reads the source disk into memory, and then allows you to create many copies of that disk, without re-inserting the source disk. Copies 40 track, 1 or 2 sided, 8 or 9 sector disks. Requires 512 KB RAM. Order # 253, $25.00 postpaid.

Custom

Lindley Systems does custom programming. We have done work for the Armed Forces, for doctors, and business professionals. Call for more information.

LINDLEY SYSTEMS 21 Hancock Street
(617) 275-6821 Bedford, MA 01730-1613
Call or Write for our free catalog.

Circle #118 on Reader Service Card

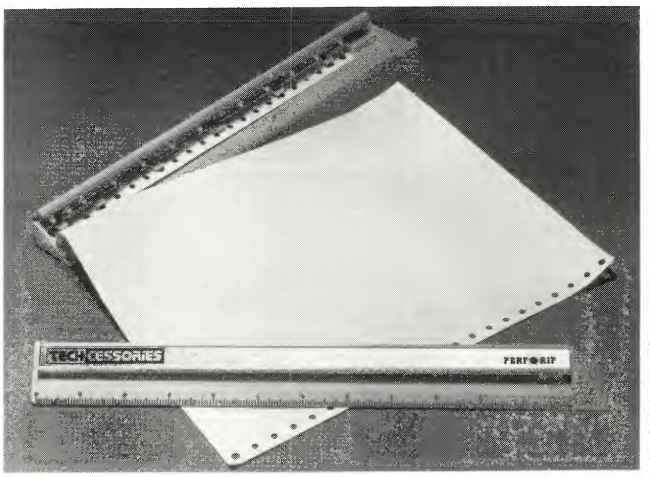
Scuttlebutt

Zenith is number 34 on the charts, although not *Billboard*'s. Instead, the company is on the computer industry "**hot list**" launched by IMS America, Ltd., at June's COMDEX. The Plymouth Meeting, Pennsylvania, market researchers base the "IMS 500" on computer store purchase invoices of over 10,000 microcomputer products. The list will be updated quarterly.

The first listing was based on first-quarter 1987 sales, and to no one's surprise, IBM was ranked number one, with Apple and Compaq following. Software publishers and peripherals manufacturers also did well, with Lotus Development Corporation coming in seventh; Hayes Microcomputer Products, Inc., was twelfth. Zenith's neighbors on the list included Panasonic (#31), Commodore Business Machines (#33), Princeton Graphic Systems (#35), and Atari (#36).

One area where Zenith does outrank IBM is in sales of portable computers, according to California-based market research company Dataquest Inc. Zenith sold 55,000 such units (batteries included) last year, **easily outdoing second-place IBM**, whose 35,000 units sold just nudged out third-place Toshiba's 32,000. This showing, along with IMS America, Ltd.'s report that portable computers are the hottest sellers in the microcomputer market, could be an invitation to complacency, but Zenith would be wise to resist the temptation. IBM isn't used to being number two, and is trying harder with its second upgrade of the PC Convertible in less than a year.

From the Andy Rooney Dept.: Didja ever wonder why so much high technology goes into computer printers, yet there's only one way—by hand—to remove those **pesky perforated edges** attached to computer paper? Well, stop wondering, because the Perf-O-Rip intends to fill that long-neglected gap in computer technology.

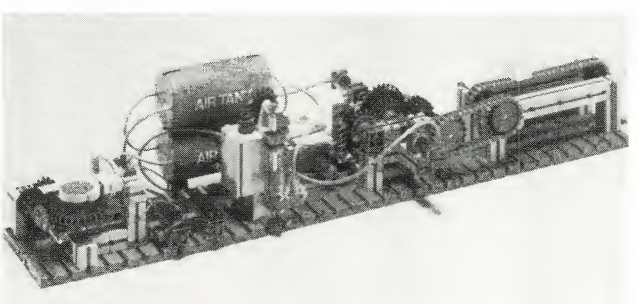


The Perf-O-Rip removes those pesky perforated edges from computer paper.

The Florida-based company Tech-cessories claims its Perf-O-Rip, which looks like a ruler and can actually be used as one, will remove the perforated edges from up to 20 pages at a time. Of course, you still have to use your hands to operate the thing, but it appears to be a bit faster, and a lot neater, than the old method. The Perf-O-Rip costs $9.95, and is available from Tech-cessories, 3421 Helena Drive, Lake Worth, Florida 33461; 305/439-0909.

They may be toys, but they're also more than that—they're geared for both children and adults, and are even used by some universities and corporations for robotics simulations. "They" are "**intelligent playing systems**" manufactured by Fischertechnik Corporation and sold in Heath/Zenith Computers & Electronics centers. The West German company's brightly colored construction and modelling sets let users not only build hundreds of models, but also power them by such methods as pneumatic control and electromechanics. The idea is to have fun, and maybe even learn something along the way—which may be why Fischertechnik's products are selling very well through Heath/Zenith.

Fischertechnik modelling sets are intelligent "toys" for children and adults.



The ZCM-1490 Flat Technology Monitor is in the stores now, and it took **$27 million** to get it there. According to Zenith's prospectus for two million shares of common stock, released in late June, about $16 million was spent through 1986 developing both the monitor and the flat tension mask tube the '1490 is designed around. An additional $5 million was spent during the first quarter of 1987, and second-quarter expenses were close to $6 million.

The prospectus states that Zenith expects the '1490 to **break even** by the end of this year, and turn a profit in 1988. A quarter million monitors are being produced per year. And, after using its television manufacturing expertise to break new ground in the microcomputer industry, Zenith is now planning to turn it right back—the flat tension mask picture tubes will be found in color television receivers by late next year.

Last time out, we told you how to keep your mouse clean. This time, we've got info on how to **keep your mouse safe and warm** when it's not in use—you keep it in a MousePouch, of course. The MousePouch is a vinyl suede pocket that holds almost any mouse type and its cord, and attaches to the side of a monitor or other surface by way of Velcro. If you don't believe in **pampering your mouse**, the pouch can be used to store or transport pens, disk labels, and up to eight 3½" disks. The MousePouch is available in two appropriate colors—light grey and natural tan—and costs $5.95. Contact H&H Enterprises, Box 2672, Corona, CA 91718; 714/737-1376.

ZRAM-205: RAM Multiplier

The ZRAM-205 package is used to modify a Z-205 memory card so that thirty-six 256K RAM chips (not included) can be installed in place of the existing 64K RAM chips giving 1024K of bank-switched memory in the form of four banks of 256K each. Bank 0 (256K) is selected automatically on power-up and must be used as part of system memory. Included MS-DOS software (with source code) makes the remaining three banks into a 768K RAM disk. The modified Z-205 still uses only one S-100 bus slot and will operate at 8MHz if 150 nanosecond RAM chips are used.

The ZRAM-205 package includes a small piggy-back circuit board, a packet of wire and sleeving, a diskette, and a user's guide. Installation takes about 2 hours and requires some soldering to connect the RAM chip socket pin-1's together and to the small circuit board. Our ZP173 PAL is required if used with new motherboard 768K Z-100™.

$49 Each (+ $8 for ZP173 PAL)

ZMF100a: 768K On Old Motherboard

The ZMF100a™ modification package lets you plug industry standard 256K RAM chips into your "old" motherboard Z-100™ computer. Up to 768K (27 RAM chips) without using an S-100 bus card slot! Maintains fully compatible memory maps so that all software will run. Usable only on part number 85-2653-1 motherboard (assembly part number 181-4917 or less)!

Installation of the ZMF100a™ package is a simple, plug-in job requiring ***no soldering*** or trace cutting and only partial disassembly of the computer. The memory chip pin-ones are connected together by a plug-in bus bar. There are no permanent changes to the motherboard.

The ZMF100a™ is a professional quality circuit board supplied with complete instructions and all required materials, except memory chips. It is compatible with the popular PC emulators and with 8MHZ speed modules.

$65 Each

FBE SmartWatch: Calendar/Clock

The Dallas Semiconductor DS1216E SmartWatch is a chip-sized module that plugs-in under the computer's monitor ROM. It contains a full-functioned calendar/clock and works in the Z-100 series (spacer kit required), Z-138/148, Z-150/160 series, and Z-158 computers. Easy installation. Our package includes the SmartWatch, MS-DOS date/time setting software on diskette (with source code) and documentation.

$44.95 Each (+ $2.00 for Z-100 Spacer Kit)

FBE

FBE Research Company, Inc.
P. O. Box 68234, Seattle, WA 98168
(206) 246-9815

Order Direct from FBE or
See Your Heath/Zenith Dealer.
UPS/APO/FPO Shipping Included.
VISA or MasterCard Accepted.

Trademarks: ZMF100a/FBE Research Co. Inc., Z-100/Zenith Data Systems, MS/Microsoft Corp., Gemini/Gemini Technology Inc., EasyPC/UCI Corp., PAL/Monolithic Memories Inc.

Circle #142 on Reader Service Card

H89 20-MEGABYTE WINCHESTER, Only $595

TIRED of swapping floppies and living with limited space?

- Boot from hard disk, 3 logical drives
- Seagate ST 225 drive and controller can be used in H/Z150-160
- External option, $125; parallel-printer port, $10
- Drive and controller for H/Z150-160, $350

H89 & H/Z150-160 SPEED DOUBLER, $34.95

STOP WAITING! Increase your computer's speed NOW! Easily installed. NO trace cuts or permanent mods.

H89

- Software-select 2- or 4-MHz
- Supports Heath, Magnolia, CDR CP/M, and HDOS
- 4-MHz Z80A included
- Complete kit with s/w.....**$24.95**

H/Z150-160

- Runs at 6.67 or 4.77 MHz
- 2.5 Norton Index with V20
- FREE hardware reset
- Satisfaction guaranteed!
- Complete kit $24.95
- V20, 8 MHz, ceramic ...$12.00

EXPANDED MEMORY FOR H/Z150-160

Super PAL—1.2 meg of memory. Disk driver included. $49.95
MT PAL—640K or 704K on single memory card $19.95

SOFTWARE FOR ALL HEATH/ZENITH COMPUTERS

Perfect Printer, Perfect Money, or MT Accountant, $19.95
Perfect Funds, $29.95 Paycheck, $39.95

ORDER NOW by writing or calling: Micronics Technology
(904) 897-4257 449 Barbados Way, Niceville, FL 32578
Checks, Visa, MasterCard accepted. Florida residents add 5% tax.
Shipping and handling: $2 Winchesters: $15

Circle #207 on Reader Service Card

HOME FINANCE SYSTEM VERSION 2

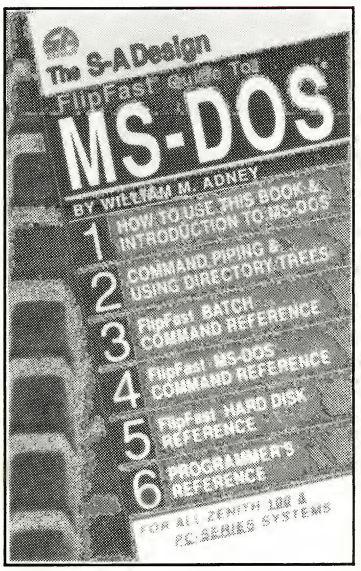
—An extensive Home Finance System that keeps track of checking, asset accounts (cash, savings, IRAs, CDs), and regular bill payments. Let your printer write your checks for you on **any** business-sized check (design your own check format).
—Checks have user defined codes and a separate flag for tax deductible items.
—Many reports, including listing all checks, or checks by codes or tax flag.
—System consists of 130 page users manual with 5 program disks (5-¼") and a sample data disk.

Hardware: H8/HZ89 (64K) or HZ100 with 2 disk drives. Any Heath®, Zenith® or other printer.
Software: CP/M or CP/M-85/86 (Ver. 2.2) and MBASIC 5.21 for CP/M.
Order: Complete System $89† (specify hard or soft sector 5¼", HZ89 or HZ100). Manual alone $21.†
MasterCard/Visa accepted, please include your phone number.
†*Prices include shipping.*

Jay H. Gold, M.D.
Jay Gold Software
Box 2024, Des Moines, IA 50310
(515) 279-9821

Circle #120 on Reader Service Card

MS-DOS Users, Rejoice!


The S-A Design
FlipFast Guide to
MS-DOS
BY WILLIAM M. ADNEY
1 HOW TO USE THIS BOOK & INTRODUCTION TO MS-DOS
2 COMMAND PIPING & USING DIRECTORY TREES
3 FlipFast BATCH COMMAND REFERENCE
4 FlipFast MS-DOS COMMAND REFERENCE
5 FlipFast HARD DISK REFERENCE
6 PROGRAMMER'S REFERENCE
FOR ALL ZENITH 100 & PC-SERIES SYSTEMS

The FlipFast Guide to Zenith MS-DOS
544 pages
$24.95
Published in August 1987

A new, extensively researched guide to Zenith MS-DOS has just been published. Written by William M. Adney, this clear and concise book quickly explains the nuances of using MS-DOS on Zenith/Heath computers. This new guide covers MS-DOS through version 3, and serves as a valuable reference tool for all users of Zenith's IBM-compatible and Z100-series systems.

The following features are among those provided in this new guide to Zenith MS-DOS:

- **Names** of all commands or subcommands
- **Syntax** with available options
- **Applications** concisely explains typical command usage
- **Examples** with "real-world" explanations
- **Requirements** for *general* usage that minimize system errors and speed computer operations
- **Application notes** provide *specific* information about command function, including quirks and tips developed from hands-on testing
- **Error messages** are explained for each command, where applicable

You'll also find the following sections in this new book:

- How to use MS-DOS
- How to use command piping & trees
- Complete batch file & hard-disk reference
- Programmer's command reference
- DOS technical reference
- Config file reference, glossary, and more!

Order your copy today!

And if you use GW-BASIC, there's a new reference book just for you!

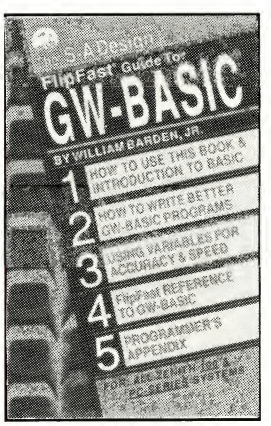
This time-saving guide clearly and quickly explains how to use GW-BASIC on Zenith systems by providing:

- **Names** of all commands, statements, and functions
- **Syntax** with available options
- **Command usage** with concise explanations
- **Examples** with "real-world" explanations
- **Requirements** for *general* usage that minimize programming errors and simplify debugging
- **Application notes** provide *specific* information about command function
- **Hints, tips, and bugs** that can save you hours of programming time
- **Error messages** are listed and explained for each command, where applicable

You get all this ***plus*** the following:

- How to use GW-BASIC
- How to write better and faster programs
- Tips on using variables
- Complete reference appendix

If you use GW-BASIC, order this book today!


S-A Design
FlipFast Guide to
GW-BASIC
BY WILLIAM BARDEN, JR.
1 HOW TO USE THIS BOOK & INTRODUCTION TO BASIC
2 HOW TO WRITE BETTER GW-BASIC PROGRAMS
3 USING VARIABLES FOR ACCURACY & SPEED
4 FlipFast REFERENCE TO GW-BASIC
5 PROGRAMMER'S APPENDIX
FOR ALL ZENITH 100 & PC-SERIES SYSTEMS

The FlipFast Guide to Zenith GW-BASIC
408 pages
$21.95
Published in August 1987

Send me the books I've checked!

❑ *The FlipFast Guide to Zenith MS-DOS*
_____ copies at $24.95 each = $_____

❑ *The FlipFast Guide to Zenith GW-BASIC*
_____ copies at $21.95 each = $_____

+ shipping charge ($2.50 ***per order*** in U.S./Canada; $4.00 ***per book*** overseas) = $_____

Total payment = $_____

These two new books do not have the spiral binding used for the earlier FlipFast guides.

❑ Payment enclosed (checks must be in U.S. dollars payable on a U.S. bank).

❑ Charge my: ___ Visa ___ MasterCard

Card #_____ Expires _____

Name _____

Address _____

_____

_____

Sextant, Dept. S30, 716 E Street S.E., Washington, DC 20003